NASA Technical Memorandum 80185

GROUND EFFECTS ON AIRCRAFT NOISE

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NOVEMBER 1979

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Space Administration

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SUMMARY

A flight experiment was conducted to investigate air-to-ground propagation of sound near grazing incidence. A turbojet-powered aircraft was flown at low altitudes over the ends of two microphone arrays. An eight-microphone array was positioned along a 1850 m concrete runway. The second array consisted of 12 microphones positioned parallel to the runway over grass. Twenty-eight flights were flown at altitudes ranging from 10 m to 160 m.

The acoustic data recorded in the field have been reduced to 1/3-octave-band spectra and time correlated with the flight and weather information. The acoustic, tracking and weather information is presented in the Appendices in a form which will allow independent analysis of the data. Only the acoustic information which was emitted at an angle of 122.5 degrees is included. A small portion of the data has been further reduced in a preliminary analysis to values of ground attenuation as a function of frequency and incidence angle by two different methods. In one method, referred to as the near-far comparison method, acoustic data at a microphone position close to the flight track are chosen as a reference and are compared with data taken at down-range microphone positions. The second method used was a direct comparison between two microphones at equal distance from the flight track but over different surfaces. In both methods, the acoustic signals compared originated from identical sources. Attenuation results obtained by using the two methods were in general agreement. The measured ground attenuation was largest in the frequency range of 200 to 400 Hz. A strong dependence was found between ground attenuation and incidence angle, with little attenuation measured for angles of incidence greater than 10 to 15 degrees.

INTRODUCTION

The levels of noise received on the ground are strongly influenced by the ground as a reflecting-absorbing boundary. During takeoff and landing, when aircraft are the closest to the ground and to large numbers of people, aircraft noise is emitted at near grazing angles to the ground, particularly toward the sideline. A consequence of the ground is that the received signal at the sideline is different than what would be expected considering only the effects of spherical spreading and atmospheric absorption. The difference in measured and expected sideline levels is referred to as lateral attenuation.

Lateral attenuation is not solely due to ground effects. At low elevation angles, shielding effects of the aircraft on the emitted noise may substantially

alter the source directivity. A basic understanding of the contributing effects in lateral attenuation is required for accurate prediction of aircraft noise. Lateral attenuation should be separated into shielding effects and ground effects because of their differing physical origins. Shielding effects are aircraft dependent while ground effects are functions of ground properties such as porosity and roughness.

A procedure for predicting propagation effects on aircraft noise was given by Putnam (ref. 1) in 1975. For predicting ground attenuation, Putnam recommended the empirical curves developed by Franken and Bishop (ref. 2) for ground-to-ground propagation and the civil NEF transition curve (ref. 3) for air-to-ground propagation. This transition curve, which gives the dependence of ground attenuation on aircraft elevation angle, is the more controversial part of Putnam's procedure. The civil NEF curve has no ground effect above about 7° elevation, whereas other estimates have been made that ground effects persist up to 30°, 50°, or even 70° elevation angles.

Pao, Wenzel and Oncley (ref. 4) have proposed an analytically-based prediction method for ground effects to replace Putnam's empirical method. This newer method predicts both ground reflection and attenuation from the empirical ground impedance formula by Delaney and Bazley (ref. 5). In accordance with Putnam's method, the analytical procedure predicts that ground attenuation of aircraft noise decreases quickly with increasing elevation angles.

The only large data set on ground-to-ground propagation over large distances was developed by Parkin and Scholes (refs. 6 and 7) in the middle 1950's. They used a small turbojet engine as a noise source and made measurements at logarithmically spaced intervals over a grassy terrain to distances of 7 km. Data were recorded under varying weather conditions over a period of two years and at two sites in England. Zorumski (ref. 8) has found fair-to-good agreement between the Pao, Wenzel and Oncley prediction method and the Parkin and Scholes data. Although the data scatter is large (due to variable weather and terrain conditions), the theory and data both show that ground attenuation effects are largest in an intermediate frequency range between about 200 to 2000 Hz. The theory also correctly predicts the magnitude of the ground attenuation and the ground reflection effects.

There are little published data on the ground effect on air-to-ground noise propagation. Walker has gathered data from several aircraft and developed empirical curves for the ground attenuation as a function of frequency and elevation angle (ref. 9). Their curves indicate large attenuation effects (10 to 20 dB) at frequencies below 200 Hz. This result is in sharp disagreement with the predictions and with the Parkin and Scholes data. Mashita and Bauer (ref. 10) have analyzed data from three aircraft and found attenuation effects in the intermediate frequency range which roughly agree with the low-angle predictions, however, their curves do not show the predicted rapid decrease of attenuation with elevation angle. Mashita and Bauer also clearly isolated aircraft dependent lateral attenuation effects and recommended that the curve with least lateral attenuation be used for the ground attenuation.

The purpose of this paper is to present a comprehensive data base for ground effects on air-to-ground propagations. These data are intended to complement the Parkin and Scholes data by including the elevation angle of the aircraft source as a variable. Shallow angles are emphasized since data are needed in the regime to settle the question of the dependence of lateral attenuation on angle. A turbojet aircraft, powered by a single rear-mounted engine, is used as a noise source in order to minimize shielding effects. Ground effects are calculated from the data to determine the variation of these effects with frequency and elevation angle.

The experimental site and apparatus are described in the first section of the paper. This is followed by descriptions of the experimental procedures and data reduction methods. Ground effect calculation methods are given and the results discussed in regard to their dependence on frequency and elevation angle. Basic data on the aircraft flights, the weather, and the noise are included as appendices so that independent studies of these data may be done by other researchers.

EXPERIMENTAL SITE AND APPARATUS

Test Site

The flight program was conducted during the first week of November 1978 at Wallops Flight Center, Wallops, Va. Figure 1 is a photograph of the general experimental site. The aircraft flight track was along runway 10-28; the flight track direction was from top left to the top right of the figure. The microphone array was located along runway 04-22 and the grassy area above (north of) the runway between the runway and the taxiway. The radar tracking site is located above and to the left of the intersection of runway 04-22 and 10-28.

The grassy areas may be described as covered with institutional grass which was cut every week. The width of the grassy area is 115 m for the wider portion and 70 m for the narrower portion close to the flight track. The soil under the grass is a mixture of sand and clay and was dry because the area had received less than 1.3 cm of rain within the thirty days before the test. Runway 04-22 is a 2500 m long, 50 m wide landing research runway with a 1300 m long, 16 m wide test section located on the centerline in the middle of the runway. The test section consists of four sections of different surfaces and finishes. The remaining portions of the runway are made of concrete finished with a burlap belt. The first test section which begins 860 m from the north end of the runway consists of 132 m of the standard runway surface with bands of grooves cut across the test section. The bands of grooves were .7 m wide and spaced .7 m apart. The dimensions of the grooves are .7 by .7 by 5. cm. The second test surface is 460 m of Portland cement concrete. The first half was finished with a canvas composition belt, the second with a burlap belt. The center half of the second test surface is grooved across the test section with .7 by .7 by 2.5 cm grooves. The third surface is 214 m in length made of Gripslop asphalt. The last section is

460 m of Bituminous concrete with the same grooved surfaces as the Portland cement section. The first half of the last section has a surface aggregate of .35 cm, the second 2.1 cm.

Aircraft

The aircraft used in the experiment is illustrated in figure 2. The airplane is powered by two engines with afterburners. Each engine develops 11,930 N of thrust at 100 percent military power setting, 17,130 N of thrust with afterburning and 490 N of thrust at flight idle. The aircraft was equipped with two optical corner cube laser reflectors. The main reflector is located on a centerline pylon 7.2 m forward of the exhaust nozzle exit and a .6 m beneath the engine centerline. A secondary reflector is located on the aft fuselage 5. m from the main reflector along the centerline, 2.2 m forward of the nozzle exits, .2 m above the engine centerline, and .7 m laterally from the centerline. Speed brakes are shown in the deployed position behind the main laser reflector. Exhaust nozzles are .4 m in diameter with .5 m centerline spacing. The nozzle centers are 1.4 m above the ground plane and protrude .6 m behind the aircraft body.

The aircraft was operated with its number one (left) engine at flight idle and its number two (right) engine at 100 percent military power without afterburning. In order to minimize flight speeds, the landing gear and speed brakes were deployed. This configuration necessitated the two laser reflectors. During the incoming flight the laser tracker locked on the main reflector but, after the aircraft passed the tracking station, the speed brakes and main landing gear doors obstructed the line of sight to the main reflector. The aircraft was tracked during the outgoing flight by the secondary reflector.

Laser Tracking

Laser tracking was used to provide the aircraft position as a function of Greenwich Mean Time (GMT) for each flight. The location and orientation of the spherical tracking system coordinates are shown in figure 3. The tracker gives ϕ, the azimuthal angle from true north, γ, the elevation angle above the horizontal ground plane, and r, the aircraft range from the tracking system. These variables are calculated at 1/2-second intervals during the flight and then later converted to cartesian coordinates (X, Y, Z) which are oriented, as shown in figure 3, with respect to the runways.

Constraints for unambigious tracking are ranges between 100 m and 36,000 m, radial velocities less than 3,048 m/sec, and radial acceleration less than 3,762 m/sec^2. Automatic tracking is possible for angular velocities less than .45 radian/sec. The tracking system's accuracy is estimated to be 0.1 milliradian (root-mean-square) for the angles ϕ and γ, and ± 0.5 m for the range.

Acoustic Instrumentation

The acoustic instrumentation consisted of twenty microphone systems located in five mobile vans. These microphones were positioned in two linear arrays: one over the concrete runway 04-22 and one over the grass strip parallel to the runway. The microphone positions are illustrated in figure 4; and the cartesian coordinates are listed in Table I in the runway-fixed XYZ-coordinate system. The components of a microphone system are illustrated in block form in figure 5. The recorded acoustic signals are time correlated with GMT.

Each acoustic instrumentation system was laboratory calibrated prior to going into the field to document the system's linearity, sensitivity, distortion, and noise floor. The results of the laboratory calibrations were used to insure that the equipment used operated within the manufacturer's specifications. Precalibration of level and frequency response and post calibration of level were done in the field. A piston phone was used in the level calibration and a pink noise source in the frequency response calibration. The pink noise calibrator signal was inserted into a microphone system behind the microphone preamplifier.

Weather Instrumentation

Weather measurements were made at a number of locations, shown in figure 4, along runway 04-22. Wind speed, wind direction, temperature and relative humidity were measured with portable 1.2 m weather stations located near Vans 1 and 5 in the open areas south of runway 04-22. A 10-meter-high portable weather station was located near Van 2 and measured barometric pressure in addition to the variable measured with the 1.2 meter stations. The output of the 1.2 stations was in the form of strip charts while the output of the 10 m station was digitally encoded and recorded on the magnetic tape recorder in Van 2. The output of the 10 m station could also be conveniently read in a real-time mode inside the van. Detailed descriptions of both types of weather stations may be found in reference 11.

A retrievable balloon was used to raise a weather measuring instrument package. Profiles of temperature, relative humidity, and wind speed up to an altitude of 500 m were measured with the balloon package. The altitude of the package was computed from pressure differences between the measured ground pressure and pressure measured aloft. The output of the package was telemetered down to an instrument van on the ground where it was displayed in a real-time mode and was encoded and recorded on magnetic tape. The balloon weather station is described in more detail in reference 12. Additional weather information was obtained from three permanent weather stations located by Building N-159, Damage Control, and the triangle area. The N-159 Station has a sensor height of 10 m, the Damage Control sensor height is 4 m, the triangle station sensors have heights of 3, 6, 9, 12, 15 m. Each station was instrumented to measure wind speed, wind direction, and temperature. The N-159 site was also equipped for the measurement of dew point and pressure. The output of the N-159 and Damage Control sites is in the form of strip charts while the triangle site output is in the form of computer listings.

EXPERIMENTAL PROCEDURE

Flight Procedure

The particular conditions for a flight were radioed to the pilot before the aircraft was incoming to runway 10-28. The flight path of the aircraft for every run was from the west to the east above the centerline of runway 10-28 at a prescribed altitude. The aircraft was flying at the particular run conditions at least 800 m before and after the intersection of runways 04-22 and 10-28. After each run the pilot would radio the control tower to inform the project engineer of the aircraft's nominal power setting, altitude, and indicated air speed for the run just completed. The various runs and their corresponding flight conditions are listed in Table II. There were 28 flights flown in two days of testing. For the majority of the flights the number one (left) engine was at flight idle and the number two (right) engine was at a nominal power setting of 100 percent military. Note that two runs at an altitude of 18 m were flown with number two engine in full afterburner.

Run 28 was done under ground static conditions. For the static test the aircraft was positioned 14.4 meters north of test point 72 located on the centerline of runway 04-22 at the 22 end of the runway. The aircraft's magnetic heading for the static run was approximately 85°. The distance down the centerline of runway 04-22 from the intersection of runways 04-22 and 10-28 to the static test site was approximately 510 m.

Tracking Procedure

The tracking of the aircraft was accomplished with the use of a laser tracking system in conjunction with a conventional radar system. After a run when the aircraft was getting into position for another flyby, the laser tracker would lose track due to obstructions of the line-of-sight path between the laser and the reflectors on the aircraft. The conventional radar system was used to locate the incoming aircraft to aid the laser tracker to lock on target.

The laser tracker also lost track of the aircraft during each run. The loss of laser track during each run was due to the large rotational rate required of the radar pedestal to track the aircraft and due to obstructions of the line-of-sight path between the laser tracker and the laser reflectors mounted on the aircraft. At the aircraft's closest point of approach to the laser tracker, the aircraft was at a range of approximately 600 m traveling at a speed of approximately 90 m per second. The electronic system of the tracker was capable of handling the resultant angular velocities but the radar pedestal could not operate automatically at a sufficiently high rotational rate. The line-of-sight obstruction between the laser tracker and laser reflectors were due to the speed brakes and landing gear doors. When the laser track was lost, the operator would manually rotate the pedestal and reacquire the aircraft with open sights so that autotracking could be reestablished. The loss-of-track introduces gaps, ranging from three to seven seconds, when no usable

positional information exists. Many practice flights were flown before the acoustic tests were run to acquaint the radar operators with the manual tracking procedure.

Acoustic Data Acquisition

The operators of the instrument vans were instructed by a radio transmission from the project engineer to turn on the tape recorders when the aircraft was incoming approximately 800 m from the intersection of runways 04-22 and 10-28. The tape recorders were turn off when the amplitude of the received signal of the aircraft was down in the ambient noise. After a run, the project engineer would radio each instrument van and inquire about data quality (i.e., microphone amplifier overload, wind, local ambient conditions, etc.). The van operators were then informed of the next run's identification number and characteristics. Each van operator kept a written data log sheet and recorded a voice annotation of each run condition on the van's tape recorder.

Weather Data Acquisition

The weather stations positioned throughout the microphone array were turned on before a data-taking period and were operated continuously for the test period. All of the weather information measured was time correlated with GMT. Each weather station was equipped with a real time output as well as a data storage medium.

The weather balloon was equipped with four microphone systems and a tape recorder. To make acoustic measurements the balloon was released to a height of 600 m. A weather profile measurement was made as the balloon ascended. The tape recorder on board the balloon had approximately 45 minutes of magnetic tape capacity. After 45 minutes of flight time, the balloon was brought down while a weather profile was being taken. Once on the ground the magnetic tape in the recorder was changed and the balloon was released again and another cycle started. The time required for a complete cycle was about an hour.

DATA REDUCTION

Tracking Data

The direct output of the laser tracker is recorded digitally and consists of spherical coordinates referenced to the laser pedestal. Coordinates are given for each half second of a flight track. Azimuth is defined as the angular deviation in a clockwise sense from true north. Elevation is defined as the angular deviation from the horizontal; the positive direction being upward. Range is measured with respect to the laser pedestal. All of the tracking information is synchronized with GMT.

The tracking data for each flight were changed from the spherical radar coordinates to the cartesian system shown in Figure 3. As noted earlier, the laser tracker lost track of the aircraft during each run. Included with the digitized tracking data is a flag which indicates the operational mode of the radar when the data were acquired. In processing flight tracks, a straight line was used to fill the data gaps. The tracking data points forming the end points of a gap were thrown away and a line was computed between the new gap endpoints. Interpolated data points were filled in at half-second intervals with their data flags set to a value of 2 to indicate interpolated data points.

The file-name format for a radar data file is EGAR nn.RAD where nn is a particular run number. Table III is an example of a computer listing of radar file EGAR26.RAD. Figure 6 is the same file illustrated in another way. In the figure the three-dimensional tracking information is split up into two two-dimensional views: an X-Y view and an X-Z view. The X-Y view includes an outline of the Wallops runways used in the test and the microphone positions by their assigned numbers. The microphone locations are along runway 04-22 and the aircraft's ground track is the dashed line along runway 10-28. Evident in the X-Z view is the straight line that has been computed to fill in a gap in the tracking information due to loss of track.

Weather Data

A representative sample of the weather information available is illustrated in Table IV for run 27. Weather information taken during the approximate time of run 27 from the ground weather stations is tabulated in Table V. Profiles of wind speed, temperature, and relative humidity taken through use of the instrumented balloon package for run 27 may be found in Appendix B.

Acoustic Data

The analog tapes of the flyover noise were reduced by one-third-octave band analysis. The frequency range of the analysis was from 20 Hz to 10 kHz with an averaging time of 1/8 second. The frequency range was selected to include more than the useful frequency range of the data. The 1/8th of a second averaging time was necessary because of the large angular velocity of the aircraft with respect to the microphones closest to the flight path. The one-third-octave band analysis was initiated for each run as soon as possible after the recorders were turned on in the field. The analysis was stopped when the amplitude of the received noise from the aircraft approached that of the background noise. Figure 7 is an illustration of the electronic equipment used in the one-third-octave band analysis.

The reduced acoustic data were divided into data files for each microphone for each run. The data files were assigned unique names and are stored on a magnetic disk. The data file structure is a sequence of one-third-octave band spectra separated in time by the one-third-octave band analysis averaging time (1/8 of a second); associated with each spectrum is a GMT, an overall level and a dBA level.

Each microphone for each testing period has two calibration data files. One of the calibration files is the result of a one-third octave-band analysis of the piston phone calibration; the second calibration file is the result of the analysis of the recorded pink noise calibration signal. The piston phone calibration is used to calibrate the amplitude of the one-third-octave band analysis. The pink noise calibration file is used in the acoustic data reduction software programs to correct for deviations from a flat frequency response of the record/playback system.

The quality of the reduced acoustic data was first checked by inspection of the overall time histories for each run for each microphone. Overall time histories for microphones 2, 4, 6, and 8 for run number 27 are illustrated in figure 8. The analysis averaging time for the time histories shown is 1/8 second. Also illustrated in figure 8 is the acoustic data file-name structure; acoustic data file names are of the following form: EGFRnn.Mmm where nn represents the run number and mm the microphone number. Broadening of the shape of the aircraft's time history is evident as the distance from microphone to flight path increases with microphone number. The effect of atmospheric propagation anomalies are more evident in the further microphone locations due to the longer propagation distances and smaller received signal. Table V is a computer listing of data file EGFR27.M02.

Ambiguities may exist in the results of the lowest frequency one-third-octave band analysis for the close microphones because of the impulsive nature of the received signal. The low-frequency bound of useful noise emitted by the aircraft is approximately the 100 Hz one-third-octave band. The one-third-octave band analyzer used in the data reduction process passes an input signal in parallel through various active one-third-octave band filters and selectively samples the output of the filters. The limiting feature of this analysis for the present case is the response time of the filters. A customary manner of characterizing filter response is to compute a so-called "BT" product (bandwidth multiplied by time width of the signal); a BT product in the range of 50 to 100 is considered satisfactory. For the 100 Hz one-third octave band and the time history of data file EGFR26.M16, a BT product calculation leads to a result of about 20 - 25. The reduced data at the lower frequency bands must be viewed with the limited response times of the filter in mind. However, the problem has its greatest effect in the example given. For higher altitude flights, microphones positioned further from the flight path, and higher frequency one-third-octave bands, the problem of limited response time of the filters lessens and rapidly diminishes.

Spectra of run number 27 for microphones 2, 4, 8, and 16 are shown in figure 9. Beta (β) is defined as the angle between the horizontal line from the receiver to the normal intersecting the source position and the slant range (SR). A data file consists of a collection of such spectra separated in time by the analysis averaging time constant. The criterion which was used to select the four spectra shown out of their respective data files is that each of the chosen spectra had the largest overall level. Observed in the spectra of figure 9 is a double hump formation which broadens (over a number of one-third octave bands) and deepens with increasing propagation distance.

CALCULATION OF GROUND EFFECTS

Various possible methods may be used to calculate ground effects. Most methods are comparative in nature in that a relative difference is taken between two microphone signals. After a methodology is chosen, the manner in which the portions of the signals to be compared are selected becomes a critical issue. Criteria which may be used to select the portions of the signals are maximum overall level, maximum level in a particular one-third octave band, closest point of approach, and sound emission angle, to name a few. From a trial and error approach, two methods to compute ground effects which were found to be the most reliable and consistent are described in this section of the paper. Included in the discussion is the criteria used to select the portions of the signals to be compared. In the appendices, acoustic, weather, and tracking information is compiled in a form which it is hoped will allow independent researchers to analyze the data using different methodologies. The large amount of acoustic data was compacted into a volume which more readily could be included in a single publication. Only the acoustic data that were emitted at an emission angle of 122.5 degrees are included in the appendices. The significance of 122.5 degrees emission angle is included in the following discussion.

Comparison of Near and Far Microphones

The method used by Parkin and Scholes (refs. 6 and 7) to calculate ground effects was a comparison in the frequency domain of near and far microphones positioned over the same terrain. In the method a microphone close to the acoustic source is chosen as a reference microphone. The reference microphone signal is compared to the signals of the remaining microphone locations, referred to as measurement microphones. Corrections are made to measurement microphone signals for differences in spherical spreading and atmospheric attenuation between the reference microphone and the measurement microphone locations. The difference is then taken between a reference spectrum and a corrected measurement spectrum. The result of the subtraction is a measure of the relative difference in ground effects between the two positions. If the reference microphone signal is free of ground effects, the procedure results in a measure of the absolute ground effect of the measurement location.

In practice the method of comparing near and far microphones is very sensitive to differences in sound directivity between the signals to be compared. With a static experiment like those of Parkin and Scholes, the problem of differences in source directivity was not large. As an aircraft flies by a microphone, the emission directivity angle of the received signal is constantly changing. The problem of directivity synchronization involved in comparing two signals from different microphones in a flight experiment is a major one. For flight work the solution is to insure that the signals from two different microphones to be compared have the identical source emission angle.

For the present study implementation of the near-far comparison method was accomplished with the aid of a computer using the data management system

discussed in an earlier section. A reference microphone, run and source emission angle are selected. The reference microphone usually chosen is microphone 16, a 1.2 m microphone under the flight path. This particular microphone is selected because it has minimal influence of ground effects since it is positioned over an acoustically hard surface (concrete) and is under the flight path. All microphones above a surface, however, are subject to the influence of the interference between direct and reflected sound paths. The emission angle chosen is 122.5 degrees, referenced to the forward inlet direction. This particular angle freezes the position of the aircraft so that the acoustic ray paths to a particular microphone are ideally over and parallel to the surface the microphone is over, either the grassy median between runway 04-22 and the taxiway or the runway itself. The position of the aircraft which satisfies the emission angle requirement with respect to the reference microphone is calculated. A propagation time from this aircraft position to the reference microphone position is calculated using an average speed of sound. This average speed of sound is calculated using a layered model of the atmosphere incorporating a measured weather parameter profile.

The receive time for the reference microphone is the emission time plus the propagation time. The two one-third-octave band spectra of the reference microphone data file located on either side of the calculated receive time are averaged together to form a reference spectrum. The reference spectra is propagated without losses to a standard reference slant range of 100 m. The standard reference slant range allows comparison of results obtained from reference spectra from different height flights. For the particular run, a second microphone is chosen and referred to as a measurement microphone. A measurement spectrum is computed in the same manner as the reference spectrum using the same emission angle. Corrections are applied to the measurement spectrum to remove the influence of spherical spreading and atmospheric absorption due to the larger propagation distance of the measurement spectrum than that of the reference spectrum. The measurement spectrum is corrected to a 100 m slant range in terms of spherical spreading and to the original slant range of the reference spectrum in terms of atmospheric absorption. Atmospheric absorption corrections are calculated using the SAE ARP 866 method for the determination of molecular absorption.

The corrected measurement spectrum is subtracted from the reference spectrum. A ground effects spectrum results for the particular geometry (microphone combination and run) selected. The ground effects spectrum may be plotted for the particular β associated with the measurement spectrum or a number of ground effects spectra may be combined to form plots of ground effects versus angle for individual one-third-octave bands.

Comparison of Microphones Over Concrete and Grass

An alternative method to the near-far comparison method to calculate ground effects is a direct comparison between two microphones equal distance from an acoustic source but positioned over different surfaces. One microphone should be located over an acoustically hard surface, the other over an acoustically soft surface. An advantage of the direct comparison method is

that there is no need to use corrections for differences in spherical spreading and atmospheric absorption between the two signals to be compared. The direct comparison method has the same source directivity problem as the previous comparative method. To solve the problem the source emission angles of the two signals to be compared are again constrained to be equal. The difference is then taken between the signals of the two microphones in the frequency domain. The result is a spectrum which is a measure of the relative difference in ground effects between the two microphone locations.

A microphone pair, run number, and source emission angle are input into a data analysis computer program. The possible microphone pairs for the present study which are equal distance from the flight path are the following: microphones 1-13, 2-14, 3-15, 8-18, 9-19, and 11-20. An emission angle of 122.5 degrees is selected. As discussed in the previous section, an emission angle of 122.5 degrees freezes the aircraft position so that the acoustic rays to a particular microphone will be over and parallel to the surface the microphone was on. Once the emission position of the aircraft is found, a propagation time to a particular microphone is computed. The propagation time is added to the emission time to yield a received time for the microphone. The one-third-octave band spectra on either side of the receive time in the microphone's data file for the particular run being used are averaged. Spectra for both microphones of a pair are calculated in this manner using the same source emission angle. The difference is taken between the two spectra to give a ground effects spectrum. The ground effects spectrum represents the differences in ground effect between the two locations for the two surfaces with similar geometry of the microphones and aircraft position. Similar to the near-far comparison results, the direct comparison results may be displayed as a function of frequency for a particular β or as a function of β for a particular one-third-octave band.

DISCUSSION OF GROUND EFFECTS VARIATION WITH FREQUENCY

Results of the near-far comparison method are illustrated in figure 10(a) through 10(e). The reference microphone used was microphone number 16, a 1.2 m microphone positioned under the flight path over the intersection of runways 04-22 and 10-28. The measurement microphones, all positioned over grass, were microphones 2, 4, 6, 8, and 11. The five plots of Figure 10 represent the results of the near-far method for one run of the five different height flights flown. The directivity angle chosen to select the portions of the microphone signals to be compared with was 122.5 degrees. Plotted along the ordinate is ground attenuation in decibels, along the abscissa is frequency in Hertz. The sign convention used in calculating the ground attenuation is that a positive value signifies an attenuation. The legend in the upper right of each plot identifies the curves and lists the values of β and slant range of the measurement locations when the aircraft position was frozen. For example, the solid curve in figure 10(a) is the result for microphone 2 using microphone 16 as a reference for run 24. When the aircraft position was frozen, the slant range to microphone 2 was 262 m with a β of 33.6 degrees.

The first plot in figure 10, as mentioned in the example, is the result for run 24, a 160 m flight. The measurement microphones closest to the flight track, microphone 2, has the largest value of β and the smallest measured ground attenuation. As the measurement microphones get farther away from the flight track, the measured excess attenuation increases. The largest ground attenuation is found in the frequency range of 100 - 400 Hz.

Plot 10(b) is for run 19, an 80 m flight. Plot 10(c) is for a 40 m flight, plot 10(d) a 20 m flight, and plot 10(e) a 10 m flight. A trend of greater ground attenuation for small β is observed in the plots. An exception is the result for run 19 and microphone 6 and 8. In this instance, the measured ground attenuation for microphone 8 is less than that for microphone 6, despite the fact that the β associated with microphone 6 is larger than the β associated with microphone 8. The frequency range of maximum excess attenuation in all of the plots is from 100 to 400 Hz. In the last plot (10(e)) for the lowest flight and the smallest value of β, the measured ground attenuation for the last three microphones collapses together for frequencies greater than 100 Hz. For lower frequencies the trend of larger ground attenuation for smaller β values is again observed.

Results for the direct comparison method are illustrated in figure 11. A result is shown for one of each of the five heights flown. The actual run sequence of the results shown is run 23, 20, 17, 13, and 3. The corresponding heights of the runs are 160, 80, 40, 20, and 10 meters. Results are shown for four pairs of microphones for each run. The microphone pairs used were microphones 2-14, 8-18, 9-19, and 11-20. All of the microphones used were 1.2 m microphones. The abscissa, ordinate, and legend are identical to the ones used in figure 10. However, in the legend the curve for a microphone pair is identified by the microphone of the pair which is positioned over grass. For example, in figure 11(a) the result for the microphone pair 2-14, the solid curve, is labeled EGFR23.M02.

The same general trends are observed in the direct comparison results as in the near-far comparison results. Namely, increased measured ground attenuation for decreasing β. This is particularly true of the results for a specific run. Although there are four microphone pairs, the last three pairs are close together compared with their distance from the flight track. The resulting β for each plot cluster around two values, the value for the closest pair or the value for the last three pairs. A second trend seen in the direct comparison result as well as in the near-far results is the frequency range of the largest measured ground attenuation. The largest measured ground attenuation is seen in figure 11 to be in the frequency range of 100 to 400 Hz.

DISCUSSION OF GROUND EFFECTS

Variations with Look Angle

The spectral results for the five flights of the near-far comparison method given in the previous section may be combined to yield plots of ground attenuation versus β for individual one-third-octave bands. Plotted

in figure 12 are the excess ground attenuation results obtained by the near-far comparison method given as a function of β for the following five one-third-octave bands: 63, 125, 250, 500, and 1000 Hz. Plotted in each figure along the abscissa is β in degrees and along the ordinate ground attenuation in decibels. The data points are plotted with different symbols to indicate the slant range associated with that particular data point. Listed in the legend at the top of each figure is the range of slant range for each symbol. The different symbol plotting scheme which really identifies which microphone a data point originated from was an attempt to check for a slant range dependence in the data. In the plot for the lowest frequency band, 12(a), there is a small amount of measured attenuation for small values of β but at larger values of β the measured effect diminishes to zero. The scatter in the data is the greatest for the smallest values of β. The data scatter would be expected to be greater for the smaller values of β because the small values of β are associated with the microphones farthest away from the flight track and therefore have the largest propagation paths. In the next plot, 10(b), for the 125 Hz band there is an increase in the measured attenuation for small values of β (less than 4°), an apparent amplification for values of β between 4° - 16°, and an attenuation for the last data point. There is more scatter in the data and the last point disrupts the trend seen earlier of the measured ground attenuation going to zero as the value of β increases. In the 250 Hz plot the measured attenuation is larger and tends to zero as β increases. The measured attenuation in the next plot, the 500 Hz band plot, is less than in the 250 Hz band plot but a rapid decrease with increasing β is observed with the envelope of data points going to zero attenuation for large values of β. In the last plot for the 1 kHz band the measured ground attenuation is small for all but the smallest values of β with the data points scattered about the zero ground attenuation line.

The direct comparison results are redrawn in a ground attenuation versus β for particular one-third-octave bands format in figure 13. The same one-third-octave bands are shown in the same sequence as for the direct comparison data illustrated in figure 12. A problem associated with the direct comparison method applied to the flight program addressed earlier is clearly observed in this particular data presentation. The problem is that the microphone pairs which are applicable to the direct comparison method are either close to the flight track or at the end of the microphone array far from the flight track. The result is that most of the data points are clustered together with small values of β with only a few data points with larger values of β. The data points in the 63 Hz band plot are clustered about a zero ground attenuation line indicating little measured ground effect. Ground attenuation decreasing with increasing β and tending toward zero (except the last point) is seen in the 125 Hz band plot, figure 13(b). Large attenuations are measured for small β in the 250 Hz plot with the attenuation rapidly diminishing with increasing β. The measure attenuation is less in the 500 Hz plot but the tendency of going to zero with increasing β is again observed. The data points are scattered around a zero line in the highest frequency plot, the 1 kHz plot figure 13(e) for all measured values of β.

CONCLUDING REMARKS

Documentation of the flight experiment for low-angle propagation included discussion concerning the aircraft, the acoustic instrumentation and set up, the weather instrumentation, the experiment site, and problems encountered during the experiment. The reduction of the acoustic data by one-third octave band analysis was described, as was the reduction of the tracking and weather information The data management system designed to handle the large quantity of acoustic and tracking data was outlined.

Data analysis which is not the main purpose of the present paper proceeded along two paths. A near-far comparison method was used to calculate ground effect using a sample of the data taken. In the near-far comparison method the signals of two microphones positioned over the same terrain are compared. Results of the near-far method are given for four microphones roughly evenly spaced along the microphone array positioned over grass for five runs. The results are shown in two formats: a ground attenuation versus frequency for fixed β or a ground attenuation versus β for fixed frequency. The second analysis technique used to compute ground attenuation was a comparison between two microphones equal distance from the flight track but positioned over different surfaces. Direct comparison results are also given for five runs in both data presentation formats. In both analysis techniques, a constant emission angle criteria was used to select the portions of the two microphone signals to be compared.

The results of the two analysis methods agree in general. The largest ground attenuation was measured for the one-third-octave bands in the frequency range of 100 to 400 Hz. The measured ground attenuation quickly diminishes with increasing β. In most cases the measured ground attenuation was close to zero for β greater than 10 - 15 degrees. The results did exhibit quite a bit of scatter. The scatter discussed in the results is caused by many contributing factors. Probable factors are atmospheric parameter gradients and fluctuations, the data sampling rate in the analysis, uncertainties in aircraft position and dimensions of the tested surfaces.

An advantage of the direct comparison method over the near-far comparison method is that corrections are not needed for differences in atmospheric attenuation and spherical spreading between the microphones being compared. The two microphone signals being compared in the direct comparison method have the same emission angle and geometry; finite microphone height effects caused by differences in path length between the direct and reflected array are the same for both signals.

As in any comparison technique, the result is the relative difference between the two things being compared. In the near-far method the result is the difference between two signals propagating over the same terrain but for different distances and geometries with the accompanying differences in atmospheric absorption and spherical spreading being accounted for. In the direct comparison method the result is the relative difference between two signals which have identical propagation paths except one is over grass, an acoustically soft surface, and the other over concrete, an acoustically hard surface.

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TABLE I

COORDINATES OF MICROPHONE POSITIONS IN METERS

Mic. No.	X	Y	Z
1	-243.69	53.34	0.00
2	-246.74	53.34	1.20
3	-249.78	53.34	9.14
4	-462.99	53.34	1.20
5	-755.45	53.34	1.20
6	-926.01	79.25	1.20
7	-1149.61	79.25	1.20
8	-1388.97	79.25	1.20
9	-1606.81	79.25	1.20
10	-1848.92	79.25	0.00
11	-1851.96	79.25	1.20
12	-1855.01	79.25	9.14
13	-243.69	0.00	0.00
14	-246.74	0.00	1.20
15	-249.78	0.00	9.14
16	0.00	0.30	1.20
17	0.00	0.00	1.20
18	-1388.97	0.00	1.20
19	-1606.81	0.00	1.20
20	-1851.96	0.00	1.20

TABLE II NOMINAL AIRCRAFT OPERATING CONDITIONS

Date	Run No.	Alt. (m)	Power Setting, % Engine 1	Engine 2	Time (GMT)
11/1/79	1	9	Idle	100	11 46 38
	2	9	"	"	11 54 13
	3	10	"	"	11 58 37
	4	10	"	"	12 02 32
	5	10	"	"	12 06 47
11/2/79	6	12	"	"	19 37 32
	7	12	"	"	19 42 45
	8	12	"	"	19 48 43
	9	12	"	"	19 52 32
	10	18	"	"	19 56 13
	11	18	"	"	19 59 50
	12	18	"	"	20 03 50
	13	18	"	"	21 02 23
	14	18	"	Full Burner	21 05 58
	15	18	"	Full Burner	21 09 40
	16	36	"	100	21 13 48
	17	36	"	"	21 17 28
	18	36	"	"	21 19 58
	19	73	"	"	21 25 49
	20	73	"	"	21 29 34
	21	73	"	"	21 33 05
	22	146	"	"	21 36 39
	23	146	"	"	21 40 05
	24	146	"	"	21 43 18
	25	9	"	"	21 48 00
	26	9	"	"	21 51 58
	27	18	"	"	21 55 37
	28	Static	Off	"	

TABLE III RADAR FILE EGAR26.RAD

MODE	GMT	METERS X	Y	Z
1	21:52: 6.5	-716.2	1155.0	9.6
1	21:52: 7.0	-690.9	1114.3	9.6
1	21:52: 7.5	-666.3	1074.9	9.5
1	21:52: 8.0	-641.5	1034.7	9.6
1	21:52: 8.5	-617.1	995.1	9.6
1	21:52: 9.0	-592.6	955.5	9.6
1	21:52: 9.5	-567.7	915.7	9.8
1	21:52:10.0	-543.0	875.7	9.9
1	21:52:10.5	-518.3	836.2	10.2
1	21:52:11.0	-493.7	796.5	10.3
1	21:52:11.5	-468.4	756.4	10.1
1	21:52:12.0	-443.3	716.6	9.9
1	21:52:12.5	-417.7	676.8	9.9
1	21:52:13.0	-392.6	637.4	9.8
1	21:52:13.5	-368.5	601.6	9.5
2	21:52:14.0	-344.1	561.8	9.5
2	21:52:14.5	-319.7	522.0	9.6
2	21:52:15.0	-295.4	482.2	9.7
2	21:52:15.5	-271.0	442.5	9.8
2	21:52:16.0	-246.6	402.7	9.8
2	21:52:16.5	-222.3	362.9	9.9
2	21:52:17.0	-197.9	323.1	10.0
2	21:52:17.5	-173.5	283.3	10.0
2	21:52:18.0	-149.1	243.6	10.1
2	21:52:18.5	-124.8	203.8	10.2
2	21:52:19.0	-100.4	164.0	10.2
2	21:52:19.5	-76.0	124.2	10.3
2	21:52:20.0	-51.7	84.5	10.4
2	21:52:20.5	-27.3	44.7	10.5
2	21:52:21.0	-2.9	4.9	10.5
1	21:52:21.5	21.4	-34.9	10.6
1	21:52:22.0	46.3	-73.6	10.6
1	21:52:22.5	71.4	-112.4	10.6
1	21:52:23.0	95.0	-151.3	9.8
1	21:52:23.5	119.6	-189.9	10.6
1	21:52:24.0	144.7	-231.8	9.8
1	21:52:24.5	168.8	-270.2	10.9
1	21:52:25.0	192.4	-308.9	9.3
1	21:52:25.5	217.2	-348.8	9.8
1	21:52:26.0	241.4	-389.2	9.1
1	21:52:26.5	268.4	-429.9	9.8
1	21:52:27.0	291.5	-468.4	9.6
1	21:52:27.5	315.5	-508.8	8.6
1	21:52:28.0	339.9	-548.6	8.3
1	21:52:28.5	363.4	-586.7	8.0

TABLE IV SAMPLE WEATHER DATA RUN 27

Weather Station	Wind speed, (m/sec)	Wind direction, deg	Temperature, °C	Atmospheric pressure, mm Hg	Humidity, %	Dew Point, °C
1.2 m, Van 1	1.8	300	13.3			
1.2 m, Van 5	1.4	270	12.2			
10 m, Van 3	1.4	359	14.0	763.5	39.0	
10 m, N 159	1.8	285	15.0	764.5		-18
10 m, Damage Control	2.7	285				
3 m, Triangle	2.2	296	15.0			
6 m, Triangle	2.4	288				
9 m, Triangle	2.5	275				
12 m, Triangle	2.4	275				
15 m, Triangle	2.6	295	15.0			

TABLE V FILE EGF27.M02

DATA DUMP FOR FILE EGFR27.M02

RECORD NO. = 22 GAIN = 110 NO. SEC. = 55 IL = 13 IH = 40

REC NO.	TIME	(METERS) X	Y	Z	OSPL DBA	1/3 OCTAVE BAND CENTER FREQUENCIES (HZ) 20, 0.5K	25, 0.6K	32, 0.8K	40, 1.0K	50, 1.3K	63, 1.6K	79, 2.0K	100, 2.5K	126, 3.2K	158, 4.0K	200, 5.0K	251, 6.3K	316, 7.9K	398, 10.K
1	21:55:37.00	-335.12	542.38	-21.18	74.2	59.5	56.0	55.9	60.0	63.6	56.9	56.8	59.3	63.4	68.0	60.7	56.9	53.8	55.3
					72.2	61.2	64.0	66.3	68.2	64.1	58.0	60.2	55.1	52.7	51.4	51.1	52.2	51.6	52.9
2	21:55:37.13	-328.68	532.02	-21.23	75.7	56.0	58.5	55.9	59.5	58.6	64.2	59.5	58.3	65.9	65.2	62.2	57.9	54.0	58.8
					72.7	64.0	68.0	67.1	67.2	63.9	57.0	60.7	55.1	52.0	51.1	50.6	50.7	51.6	52.9
3	21:55:37.25	-322.25	521.66	-21.29	70.7	55.8	51.5	63.4	59.0	65.6	60.4	60.5	62.5	64.9	61.0	64.2	55.6	55.0	56.8
					67.0	58.0	58.7	59.3	60.2	57.1	55.3	55.7	52.3	51.2	51.1	50.1	51.2	51.4	52.7
4	21:55:37.38	-315.82	511.30	-21.34	71.5	55.5	52.0	54.6	60.8	55.3	61.7	57.5	59.0	61.1	65.2	61.9	55.4	51.5	54.5
					68.5	57.0	61.5	62.8	61.0	57.9	55.3	55.5	51.6	51.5	51.4	50.6	52.2	51.1	53.2
5	21:55:37.50	-309.39	500.93	-21.39	73.2	53.0	54.5	54.6	60.3	55.1	57.4	59.8	55.5	63.1	65.7	61.2	56.4	54.0	57.8
					69.5	60.0	62.7	64.3	62.0	60.1	55.8	56.5	54.1	51.5	50.6	50.8	51.5	51.1	51.9
6	21:55:37.63	-302.96	490.57	-21.44	73.0	54.8	52.8	61.6	59.3	59.8	65.9	56.3	66.0	64.4	60.7	61.7	54.6	55.3	57.5
					70.5	59.7	61.0	64.1	64.7	62.1	56.5	58.5	54.6	53.0	51.4	50.6	51.0	51.6	52.4
7	21:55:37.75	-296.52	480.21	-21.50	73.2	54.3	52.5	60.6	57.8	61.3	60.2	56.5	64.0	68.1	64.2	61.7	58.1	55.0	56.8
					70.2	59.5	61.0	62.8	64.0	61.4	56.3	58.2	56.3	52.7	50.9	49.8	52.2	52.4	52.7
8	21:55:37.88	-290.09	469.84	-21.55	74.5	57.5	52.8	61.1	60.0	64.1	65.2	60.8	66.5	65.6	63.0	60.4	55.4	54.3	54.8
					69.0	57.7	63.2	64.3	61.0	60.4	55.3	58.2	55.6	53.0	51.6	50.8	51.5	51.4	52.9
9	21:55:38.00	-283.66	459.48	-21.60	74.2	58.5	55.3	61.1	60.0	61.6	60.4	63.0	59.8	61.4	64.5	64.4	60.9	55.0	57.0
					70.5	58.5	64.7	64.8	63.7	64.4	58.5	58.0	57.3	53.5	51.4	51.1	51.5	51.9	53.4
10	21:55:38.13	-277.23	449.12	-21.65	76.0	57.0	57.5	61.4	57.8	61.6	57.9	64.8	66.5	67.6	66.5	66.7	60.4	56.0	59.0
					75.7	57.2	65.2	65.6	64.7	68.6	64.8	63.5	61.3	55.5	52.6	50.8	51.5	51.6	52.7
11	21:55:38.25	-270.79	438.76	-21.71	79.5	53.3	59.5	56.1	53.0	60.3	65.7	61.0	65.3	63.9	65.0	66.2	58.6	59.3	60.5
					78.2	60.2	64.5	68.1	69.0	73.9	68.8	67.5	67.3	58.0	54.1	51.1	51.7	51.9	52.9
12	21:55:38.38	-264.36	428.39	-21.76	80.5	59.5	60.8	63.1	62.0	57.1	65.4	67.0	65.0	65.4	62.7	65.2	61.6	57.3	59.3
					79.0	65.0	68.0	68.8	70.2	74.4	70.8	69.7	66.1	59.0	54.9	50.6	51.0	51.1	53.2
13	21:55:38.50	-257.93	418.03	-21.81	76.7	59.8	54.5	60.9	63.3	60.6	62.7	60.0	61.5	64.9	61.5	63.7	59.1	57.5	58.8
					75.2	61.5	60.2	64.3	66.2	70.9	66.5	64.2	62.6	54.7	52.1	50.6	51.7	51.6	52.9
14	21:55:38.63	-251.50	407.67	-21.87	80.2	56.3	59.8	65.9	59.3	66.3	64.9	66.3	65.0	67.6	63.5	65.2	60.6	57.0	61.0
					80.0	62.5	64.7	68.3	72.2	75.6	73.0	68.0	68.1	60.2	56.9	51.1	51.7	52.6	52.9
15	21:55:38.75	-245.07	397.31	-21.92	80.7	53.8	58.0	61.1	57.8	65.8	61.7	70.8	70.3	64.9	63.2	63.9	65.9	59.0	60.8
					80.2	64.7	67.0	71.3	71.2	76.1	71.3	66.2	65.6	58.7	56.1	51.6	51.7	51.9	53.9
16	21:55:38.88	-238.63	386.94	-21.97	81.0	59.5	59.5	59.1	67.8	67.1	59.9	68.8	68.0	68.1	68.0	67.7	61.1	59.5	60.8
					80.7	63.0	69.5	71.1	72.2	75.1	72.5	68.2	65.8	59.5	56.1	51.8	51.2	51.1	52.9
17	21:55:39.00	-232.20	376.58	-22.02	81.5	60.3	54.3	59.9	69.3	65.8	68.9	67.3	69.0	67.6	67.0	66.4	61.6	56.3	61.5
					81.0	65.0	69.5	72.1	74.2	72.9	72.0	70.2	67.1	61.5	58.4	52.8	51.7	51.6	53.7

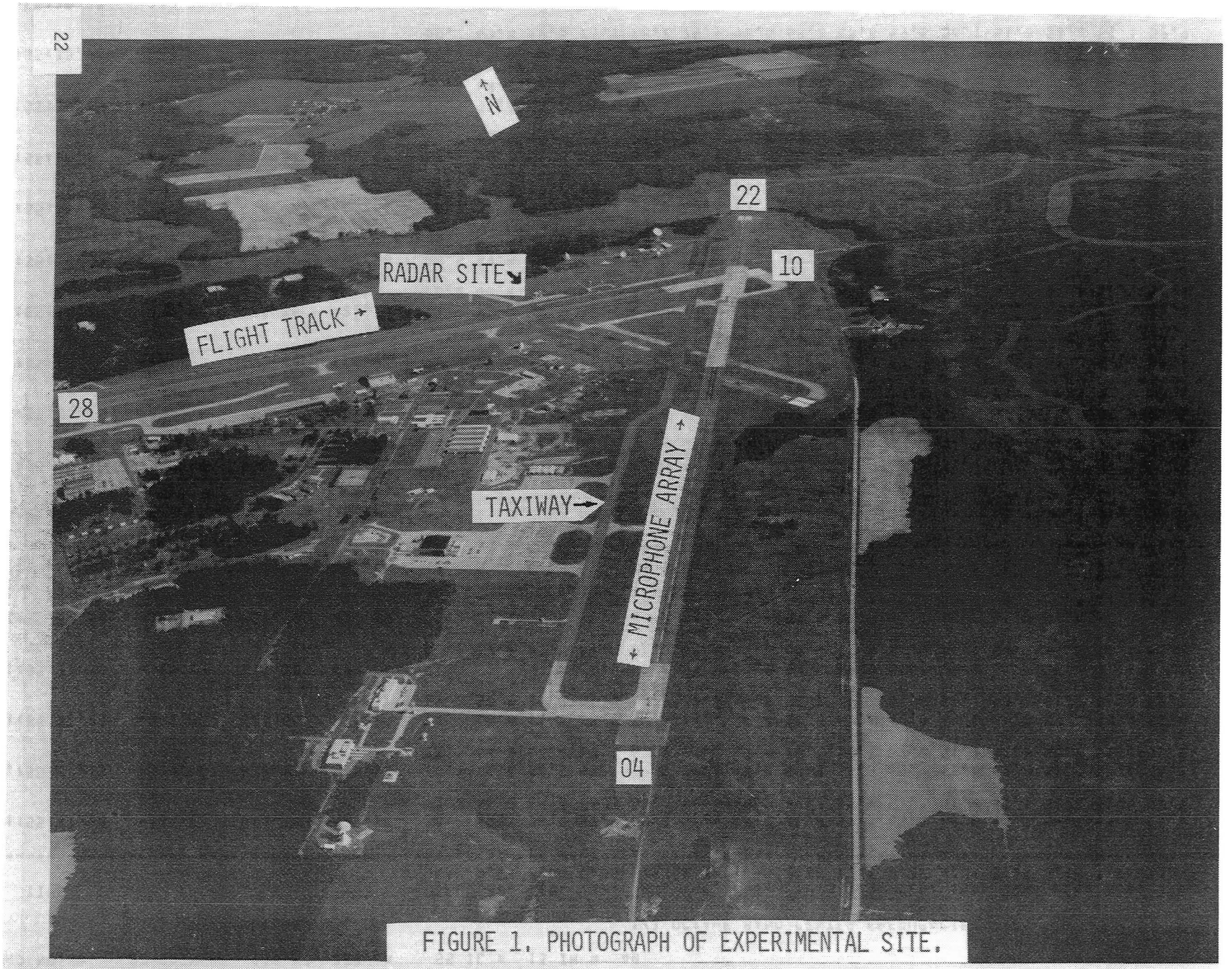


FIGURE 1. PHOTOGRAPH OF EXPERIMENTAL SITE.

FIGURE 2.A. SIDE VIEW OF NOISE SOURCE.

FIGURE 2.B. REAR VIEW OF NOISE SOURCE

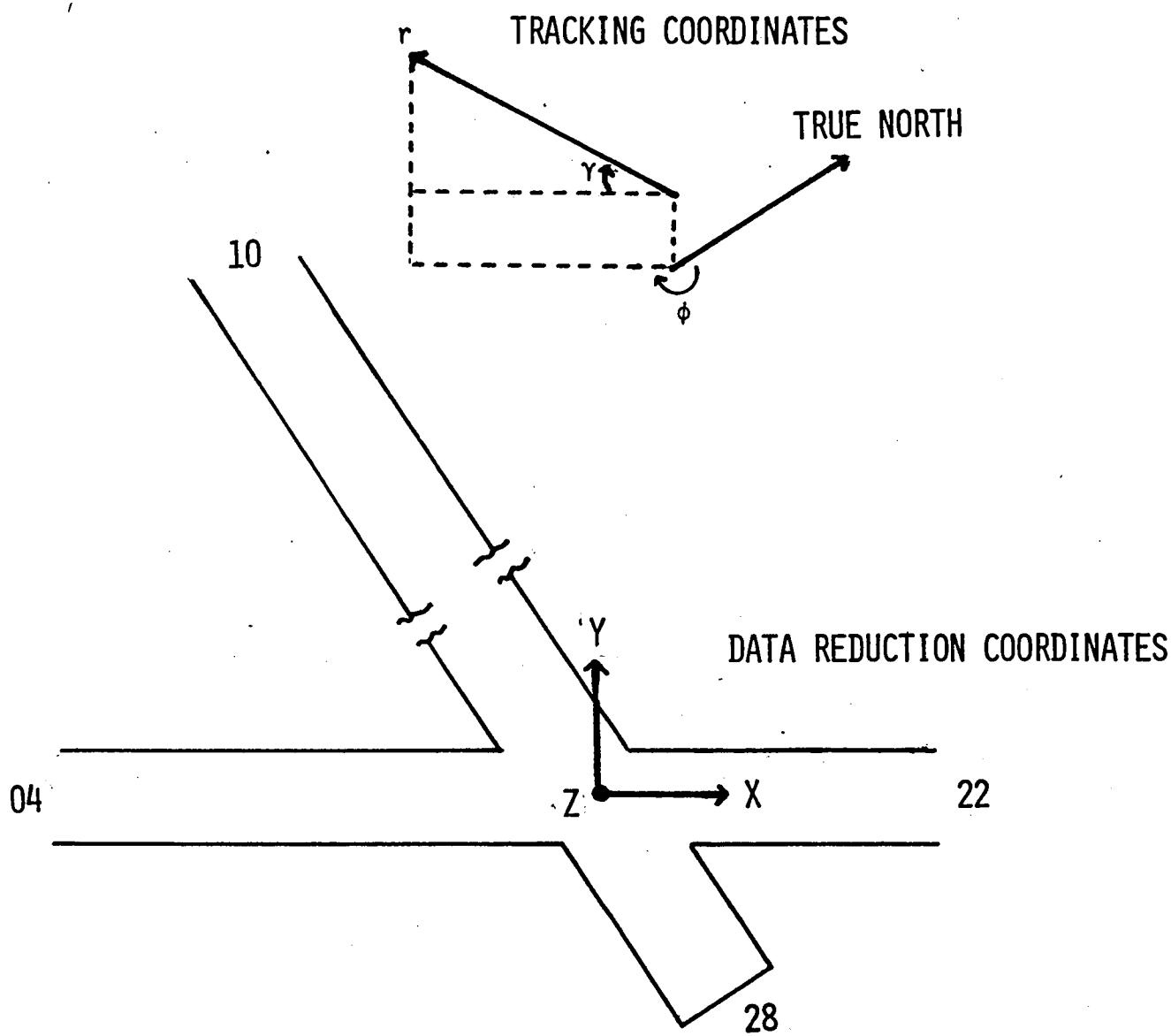


FIGURE 3. COORDINATE SYSTEMS.

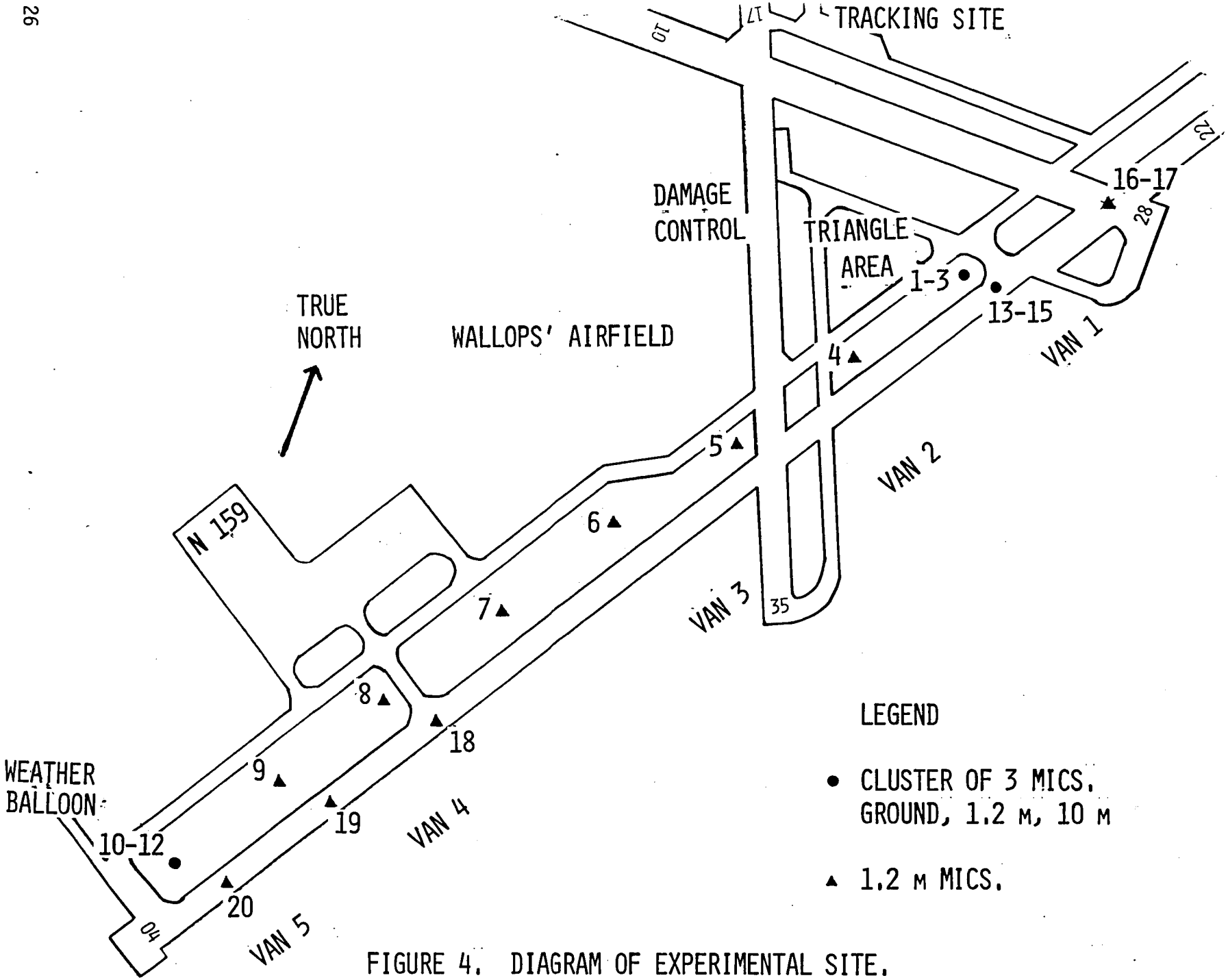


FIGURE 4. DIAGRAM OF EXPERIMENTAL SITE.

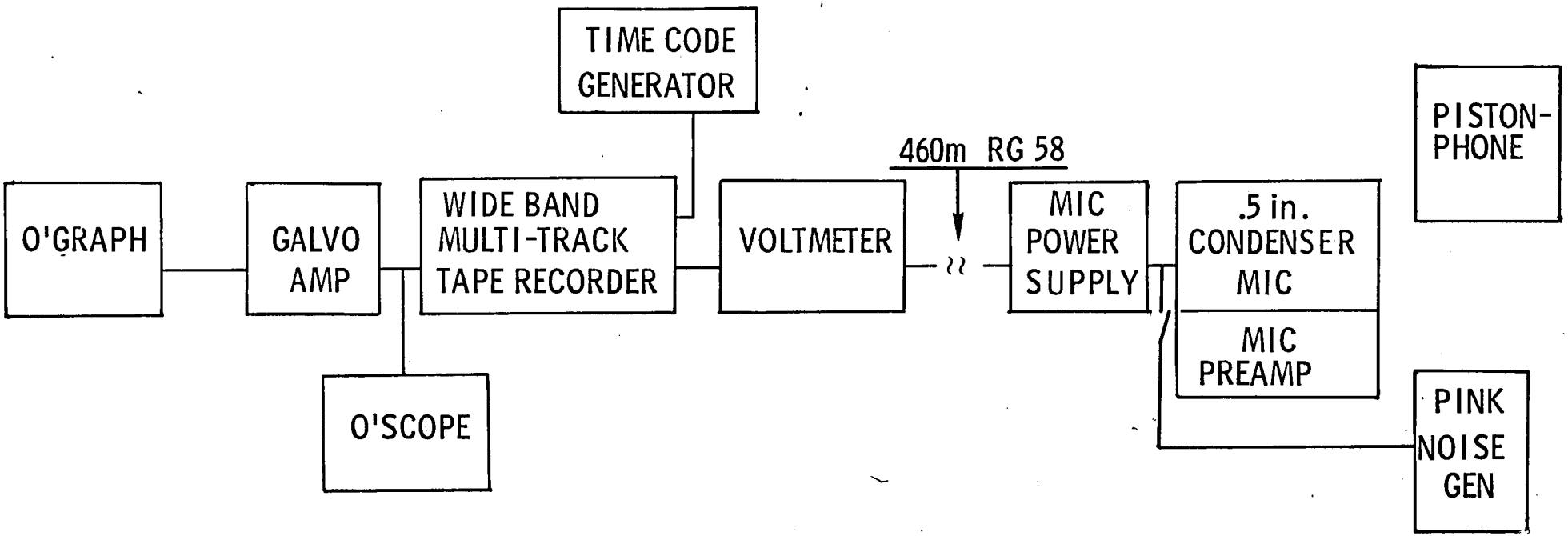


FIGURE 5. ACOUSTIC INSTRUMENTATION

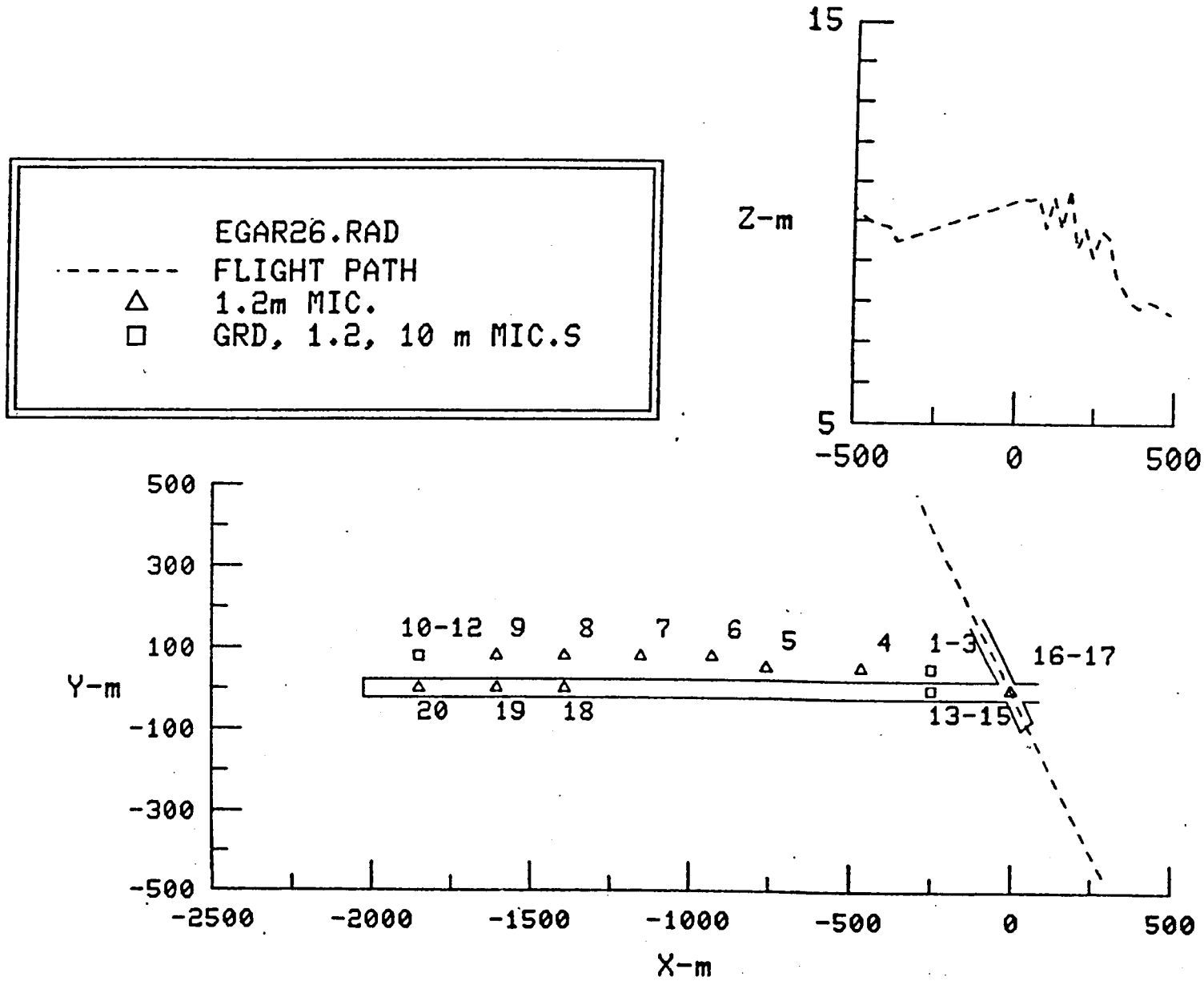


FIGURE 6. RADAR FILE EGAR26.RAD.

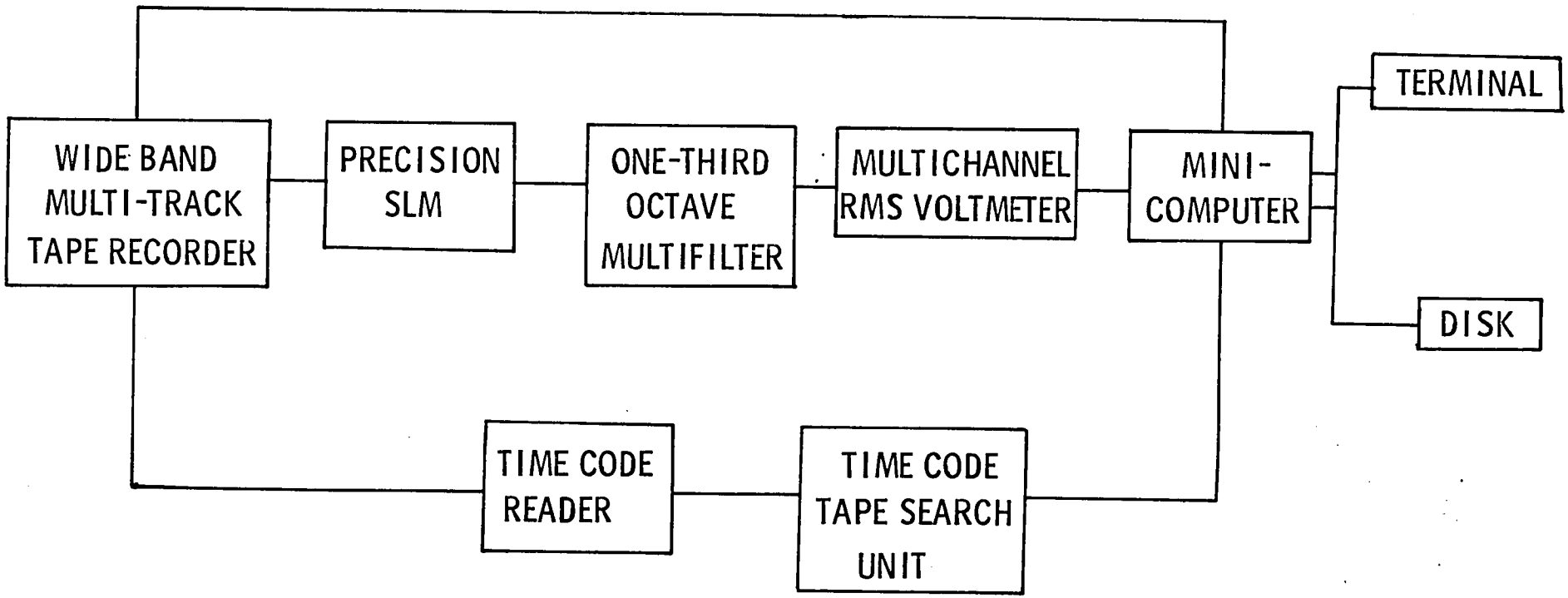


FIGURE 7. ONE-THIRD-OCTAVE BAND ANALYSIS DIAGRAM.

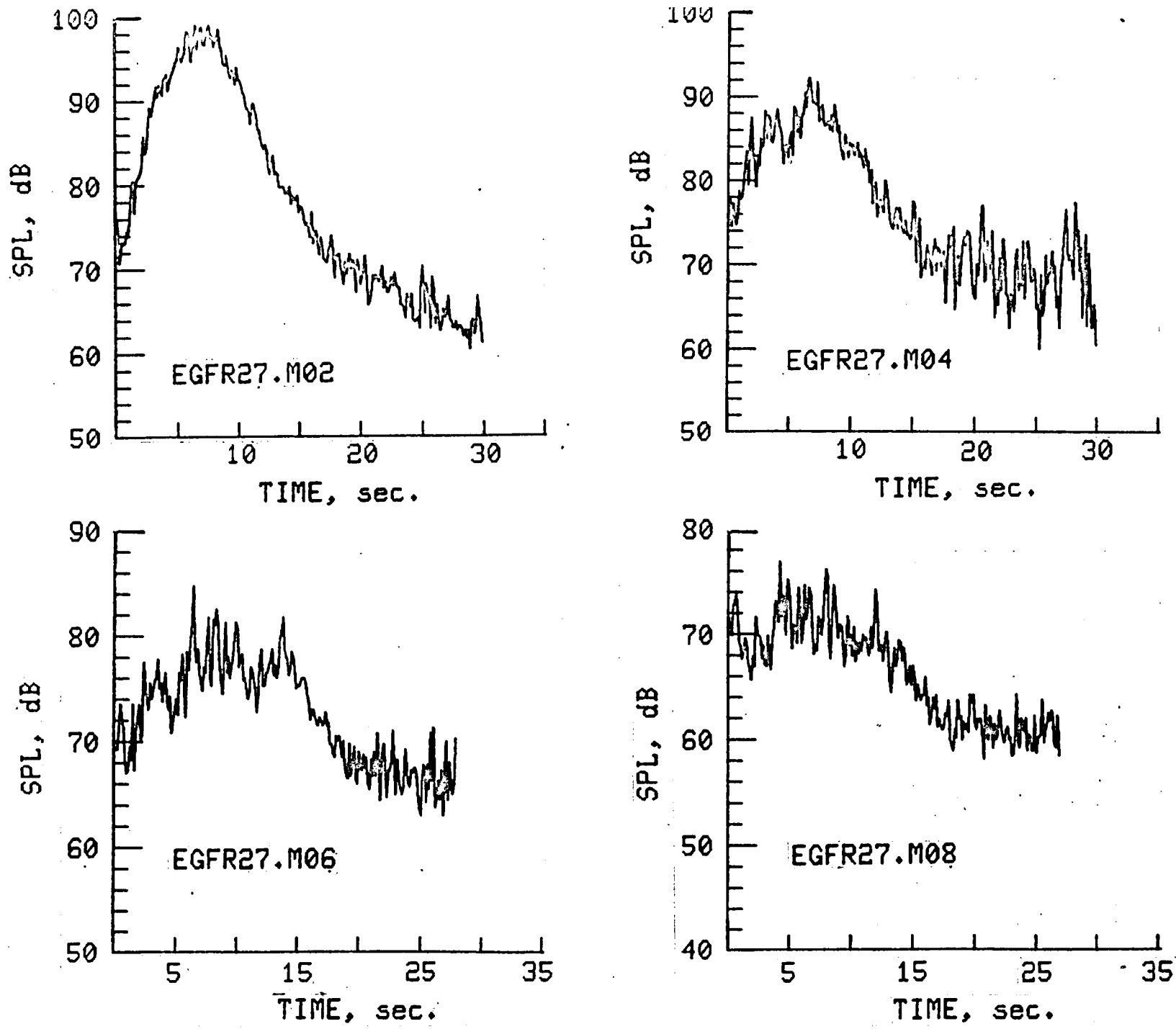


FIGURE 8. DATA FILE TIME HISTORIES.

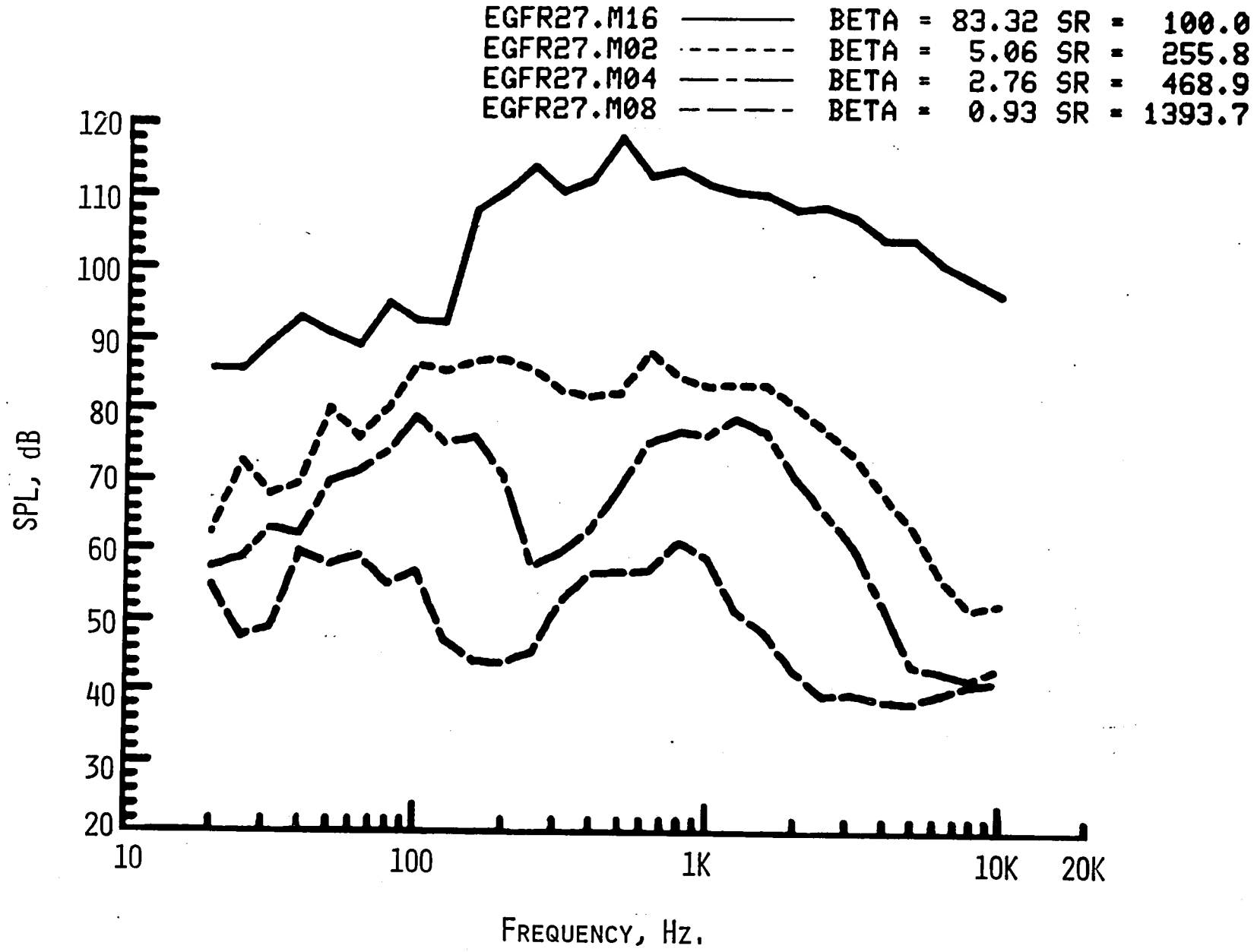


FIGURE 9. DATA FILE MAXIMUM OVERALL SPECTRUMS.

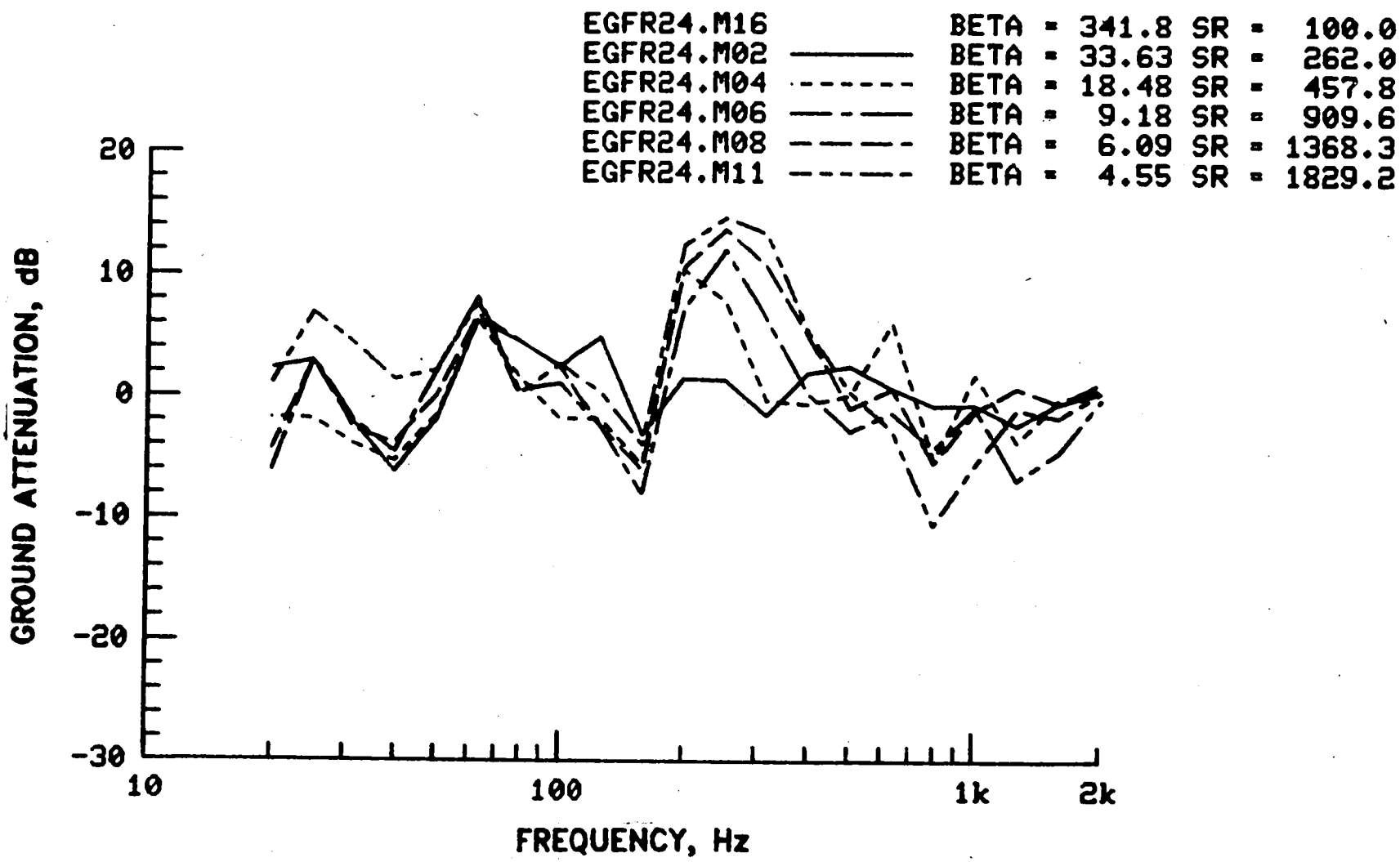


FIGURE 10. a. NEAR / FAR RESULTS FOR 160 m FLIGHT.

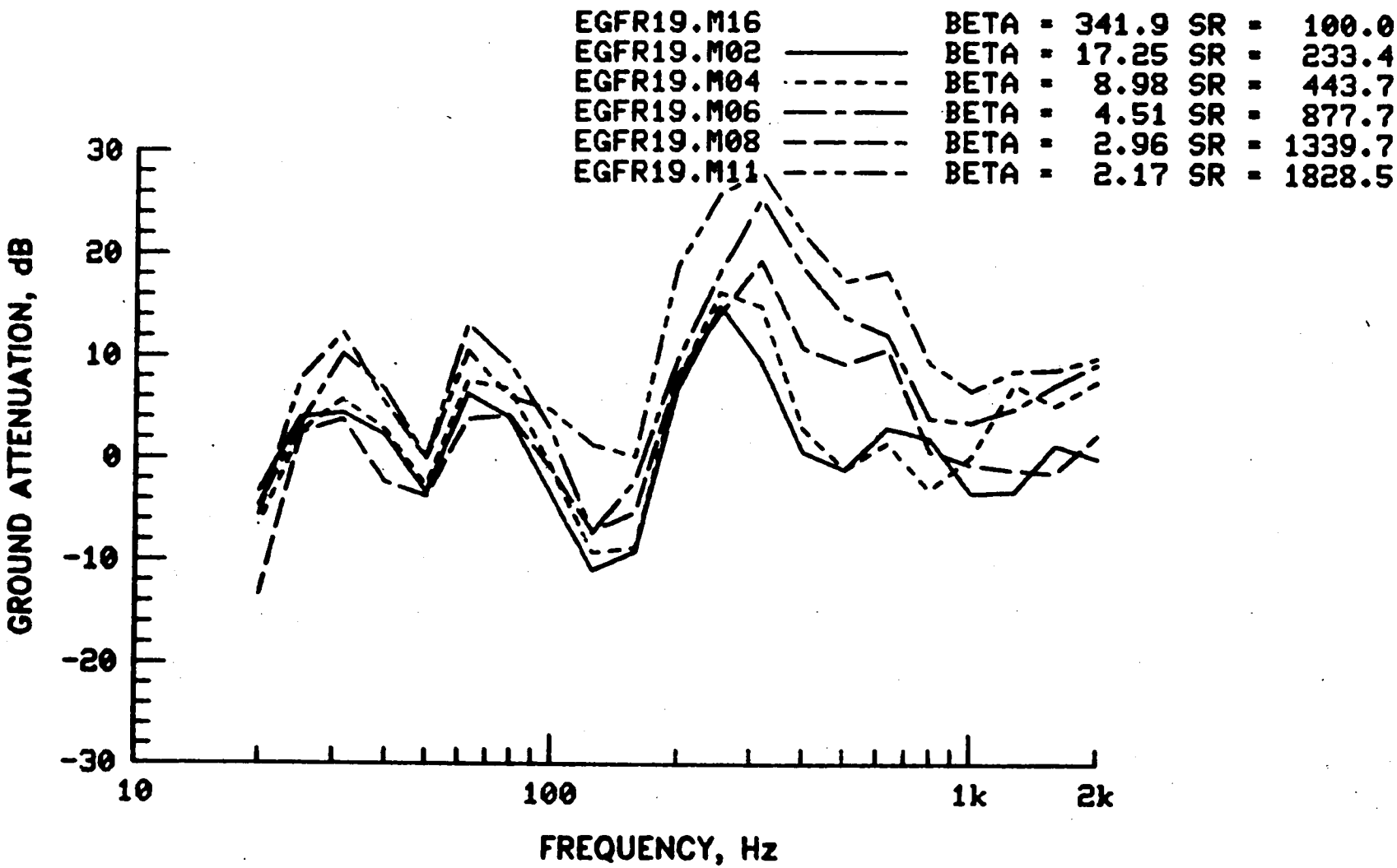


FIGURE 10. b. NEAR / FAR RESULTS FOR 80 m FLIGHT.

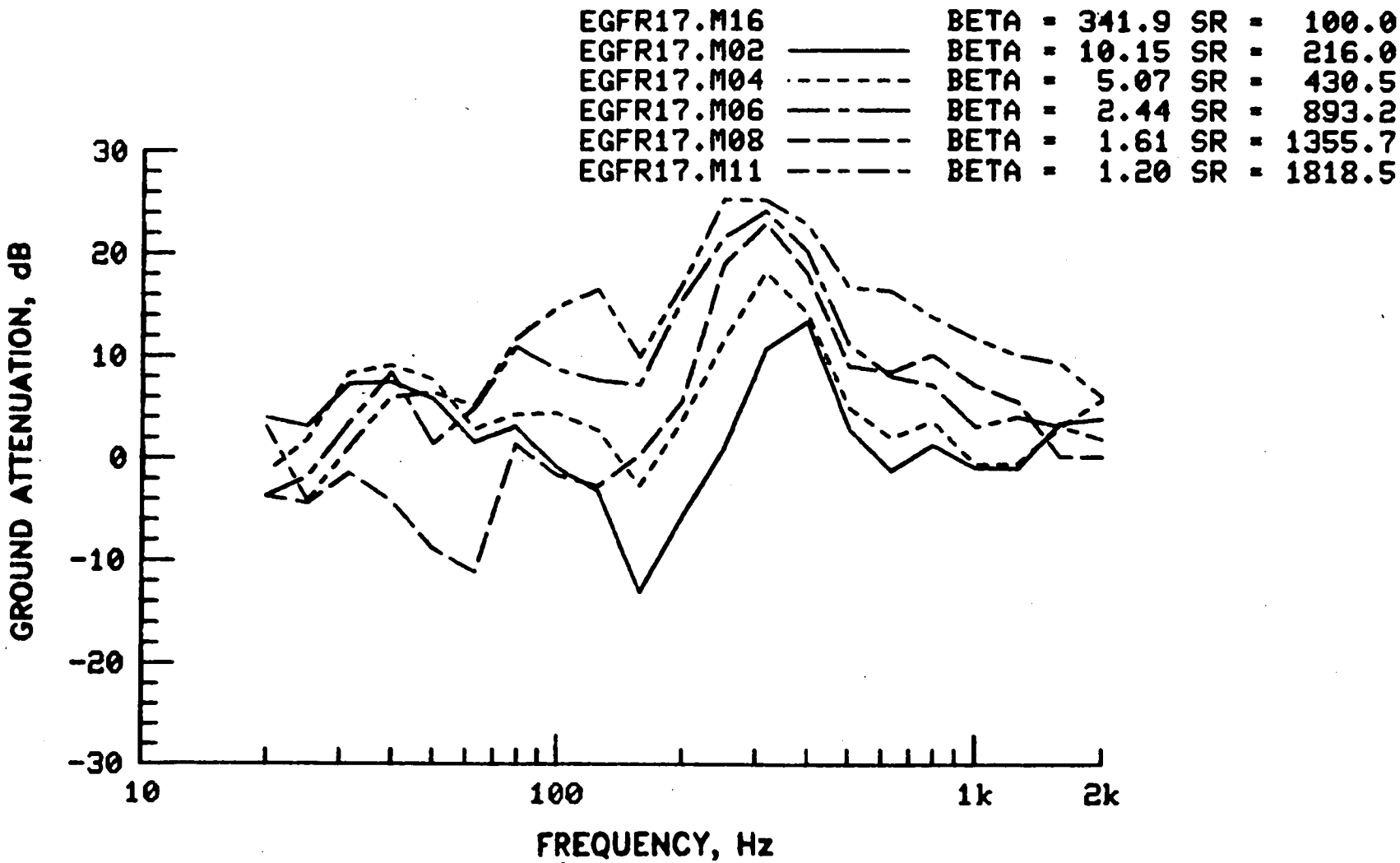


FIGURE 10. c. NEAR / FAR RESULTS FOR 40 m FLIGHT.

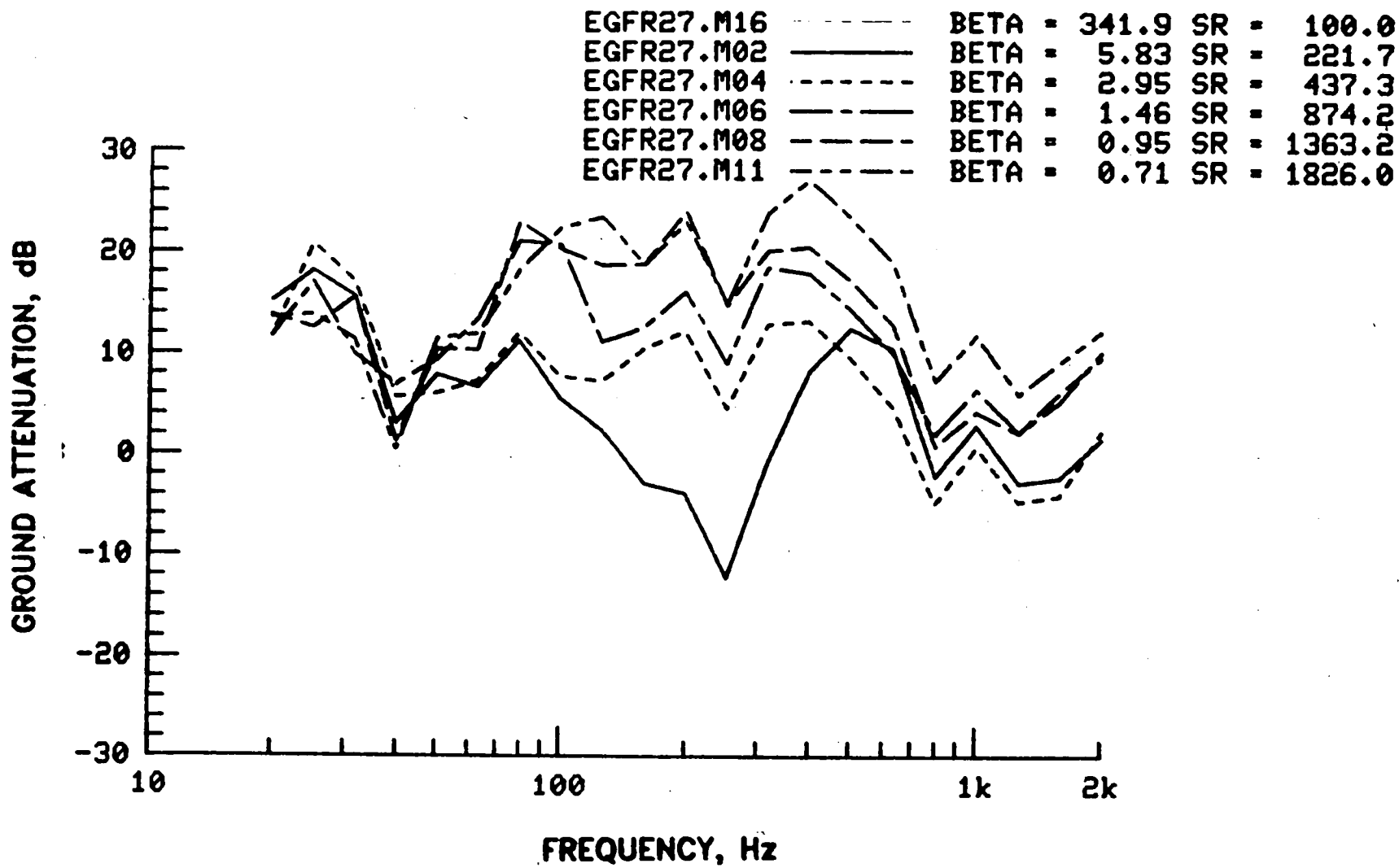


FIGURE 10. d. NEAR / FAR RESULTS FOR 20 m FLIGHT.

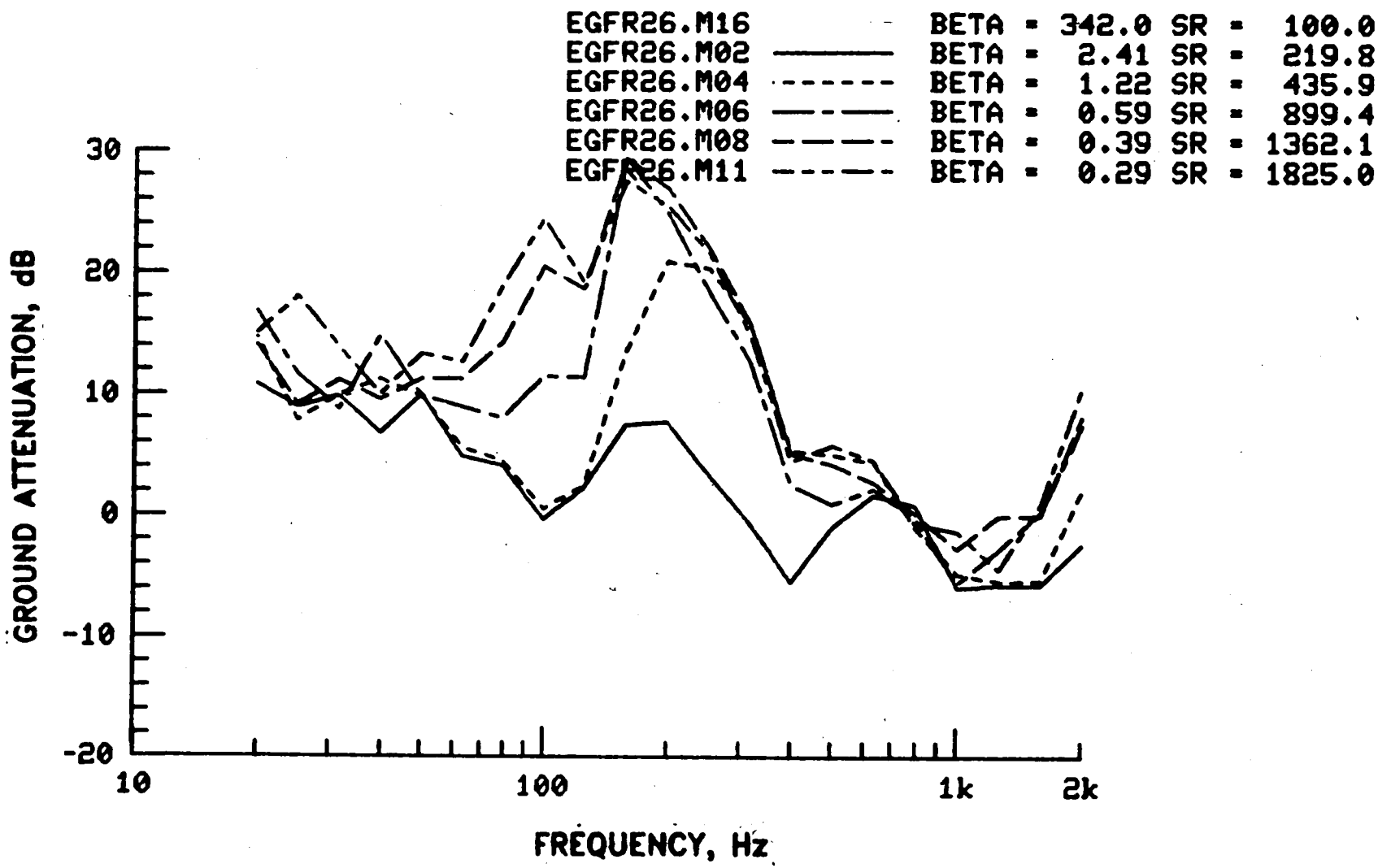


FIGURE 10. e. NEAR / FAR RESULTS FOR 10 m FLIGHT.

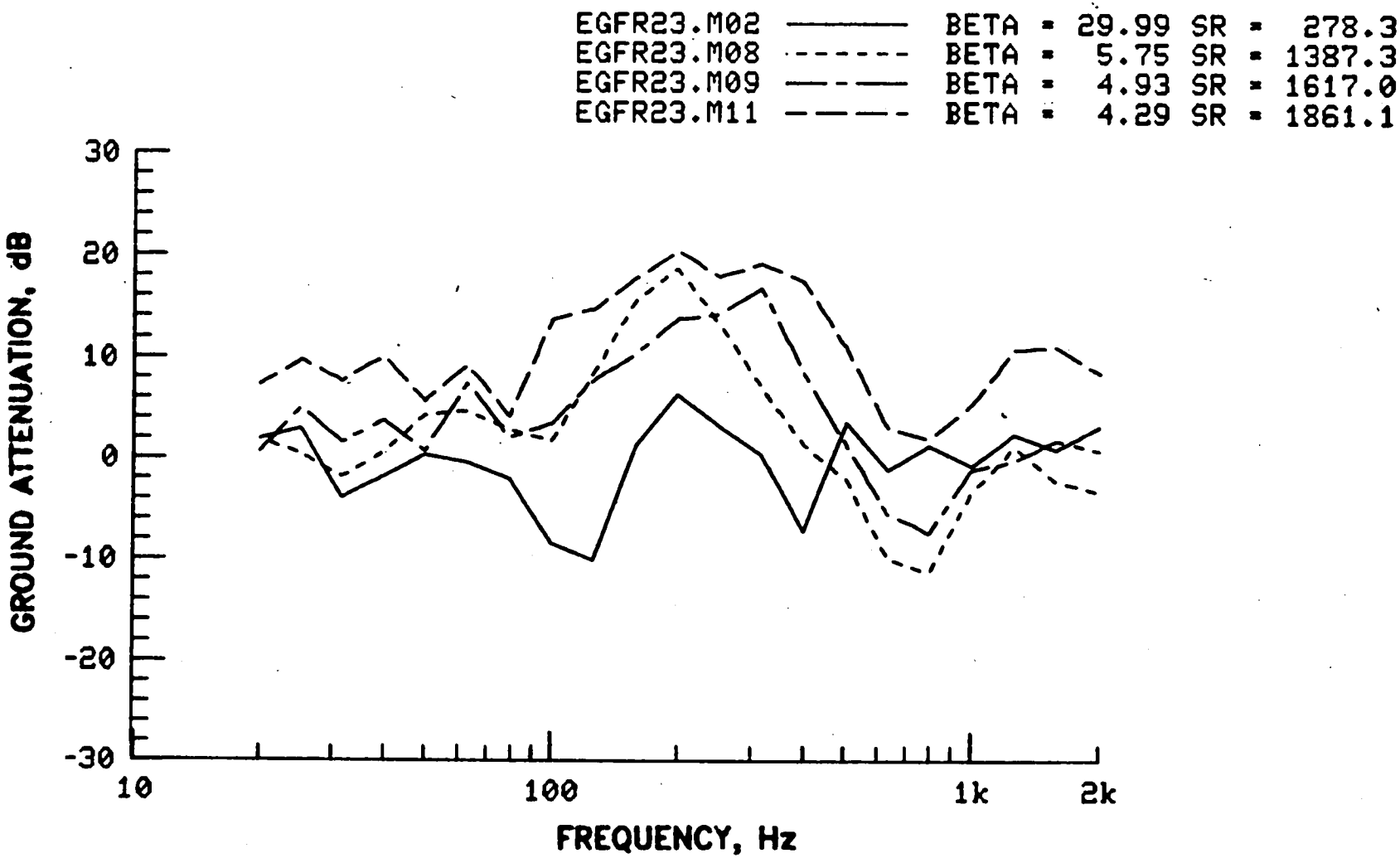


FIGURE 11. a. DIRECT COMPARISON RESULTS FOR 160 m FLIGHT.

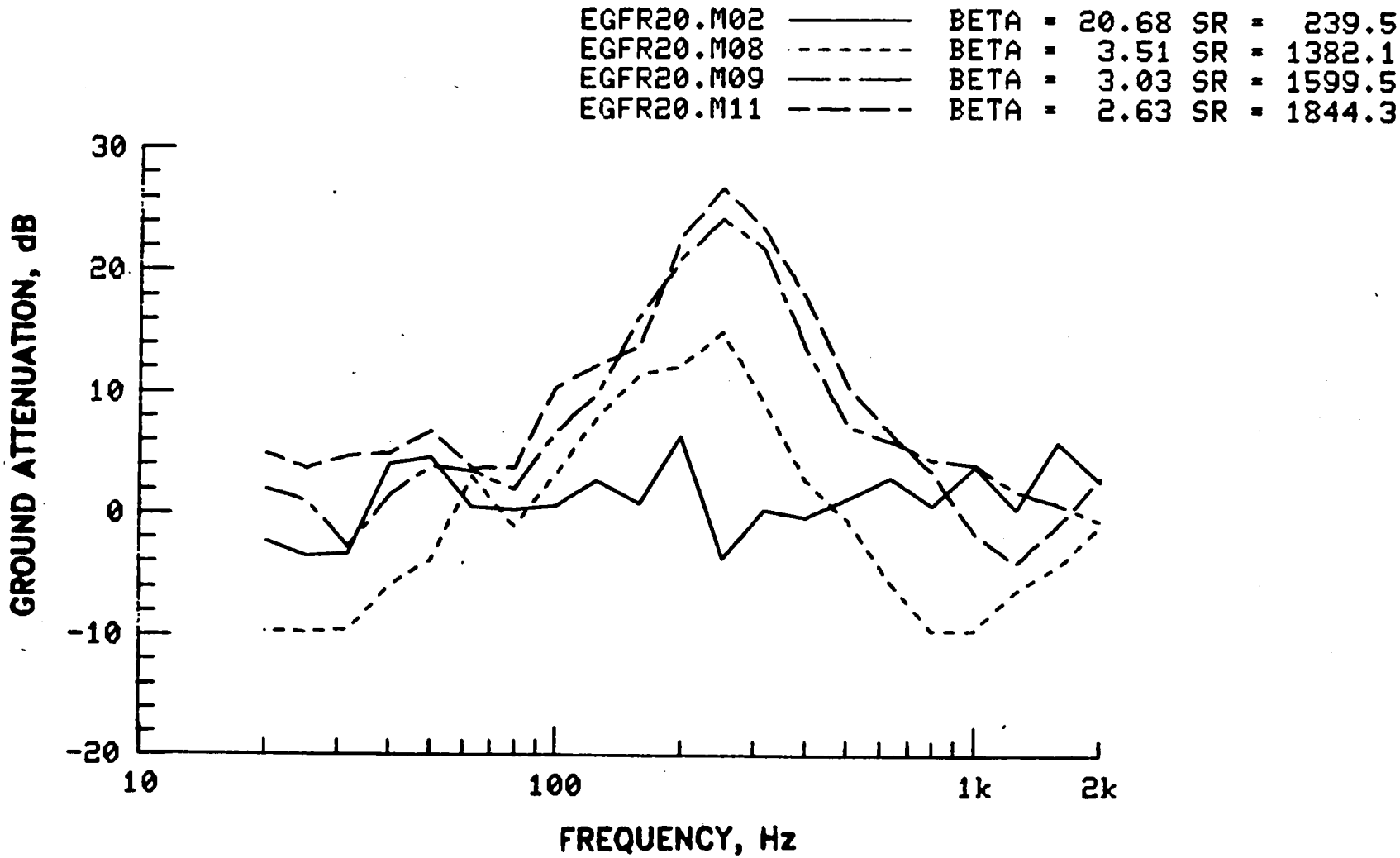


FIGURE 11. b. DIRECT COMPARISON RESULTS FOR 80 m FLIGHT.

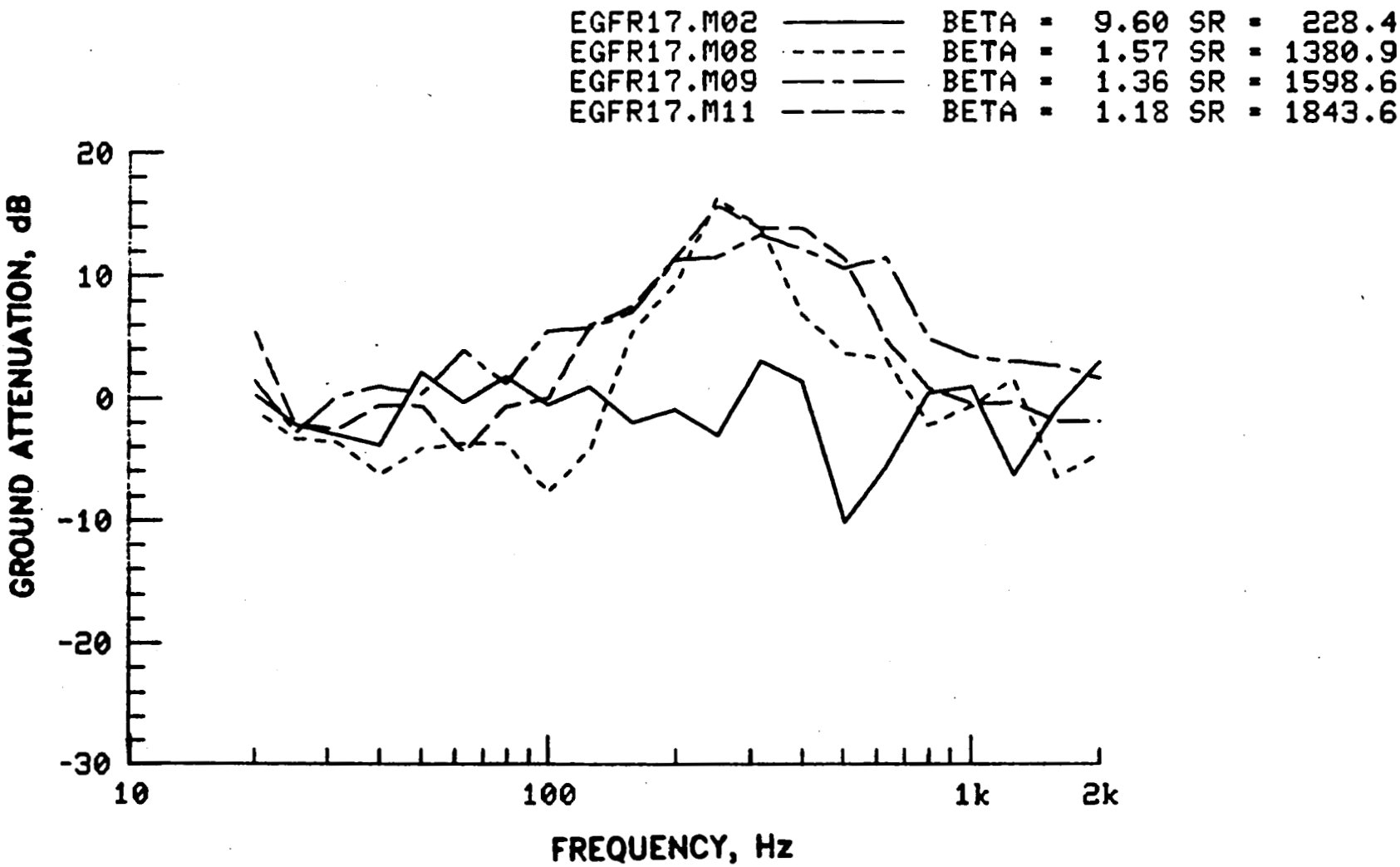


FIGURE 11. c. DIRECT COMPARISON RESULTS FOR 40 m FLIGHT.

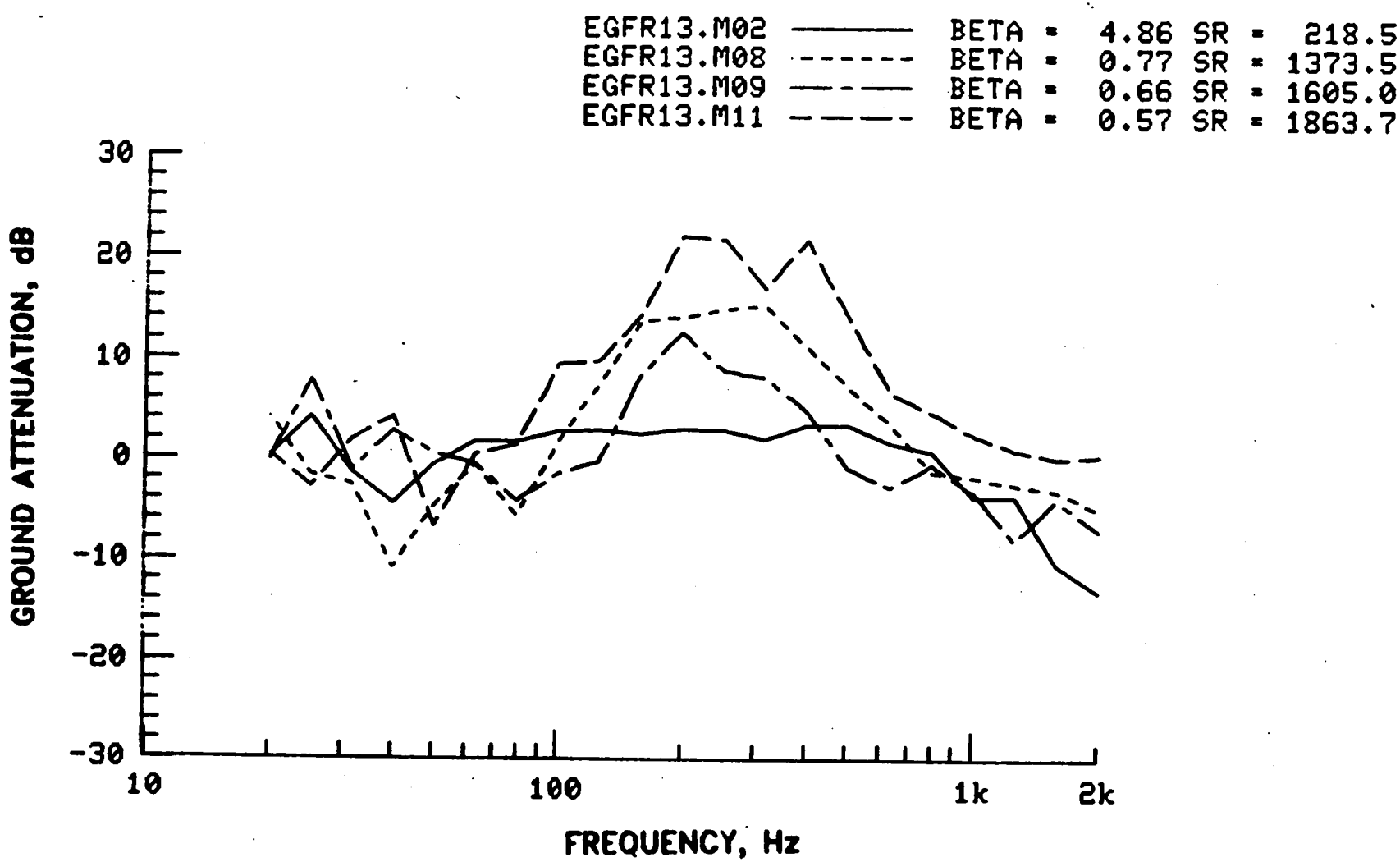


FIGURE 11. d. DIRECT COMPARISON RESULTS FOR 20 m FLIGHT.

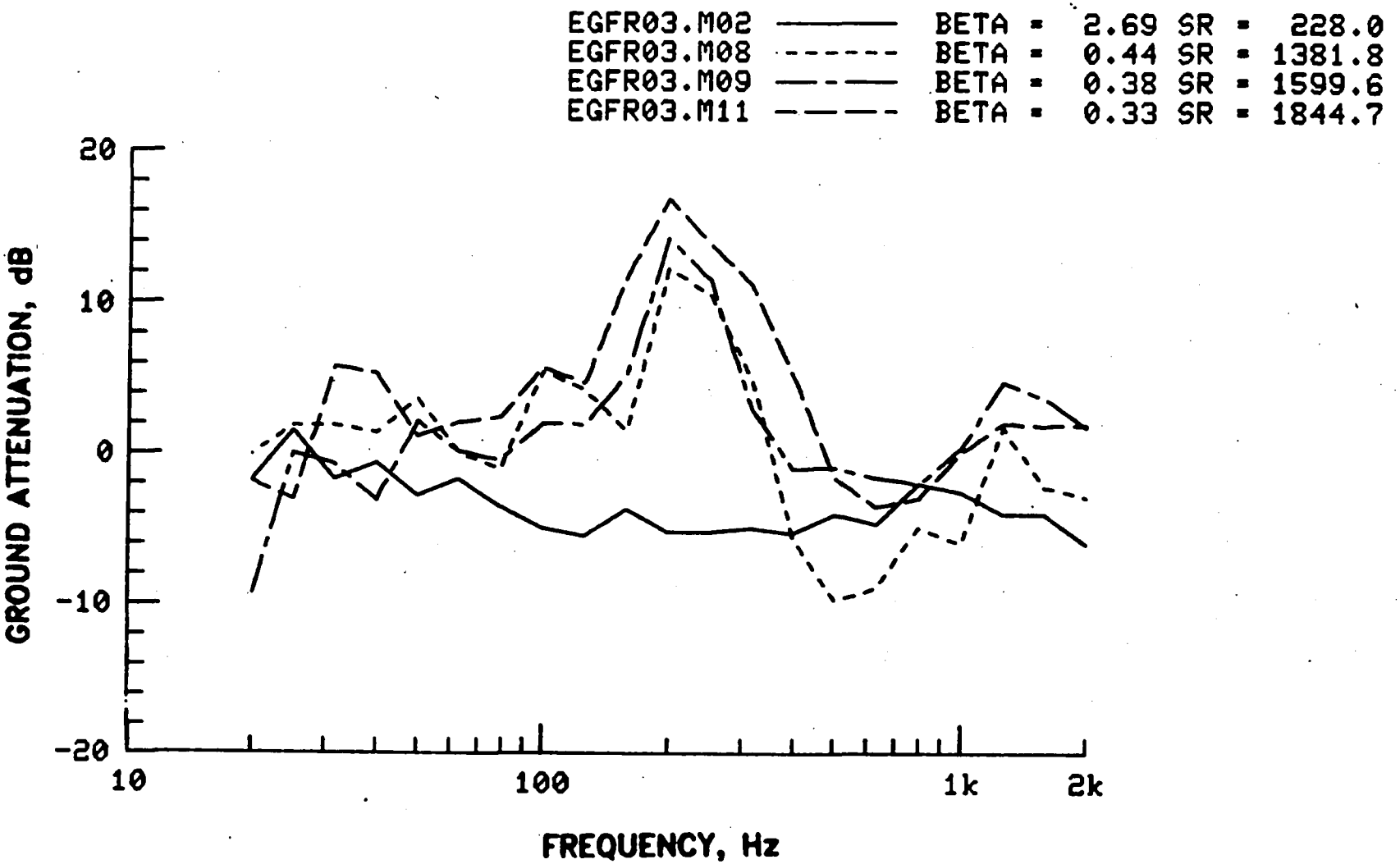


FIGURE 11. e. DIRECT COMPARISON RESULTS FOR 10 m FLIGHT.

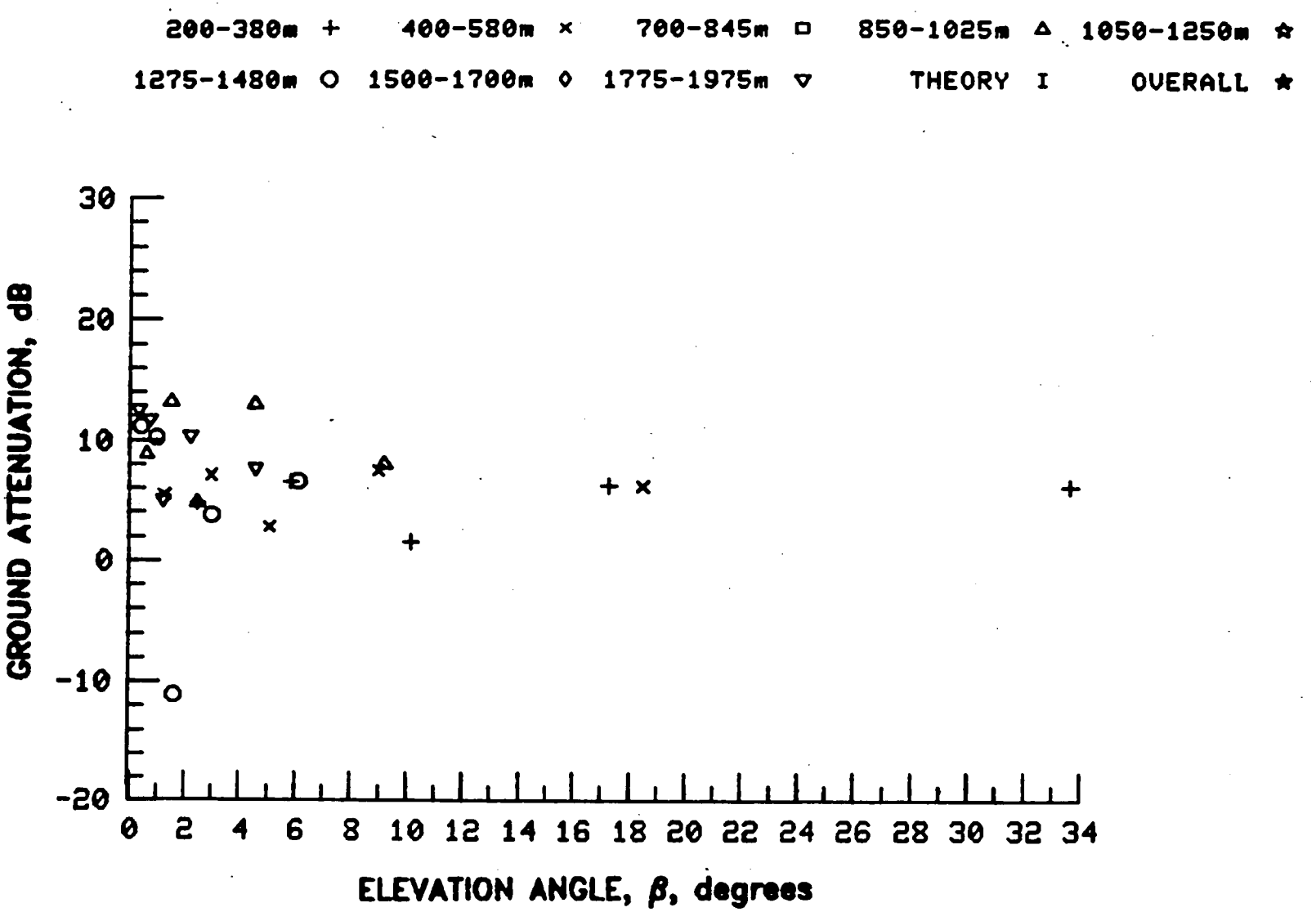


FIGURE 12. a. NEAR / FAR RESULTS FOR 63 Hz 1/3 OCTAVE BAND.

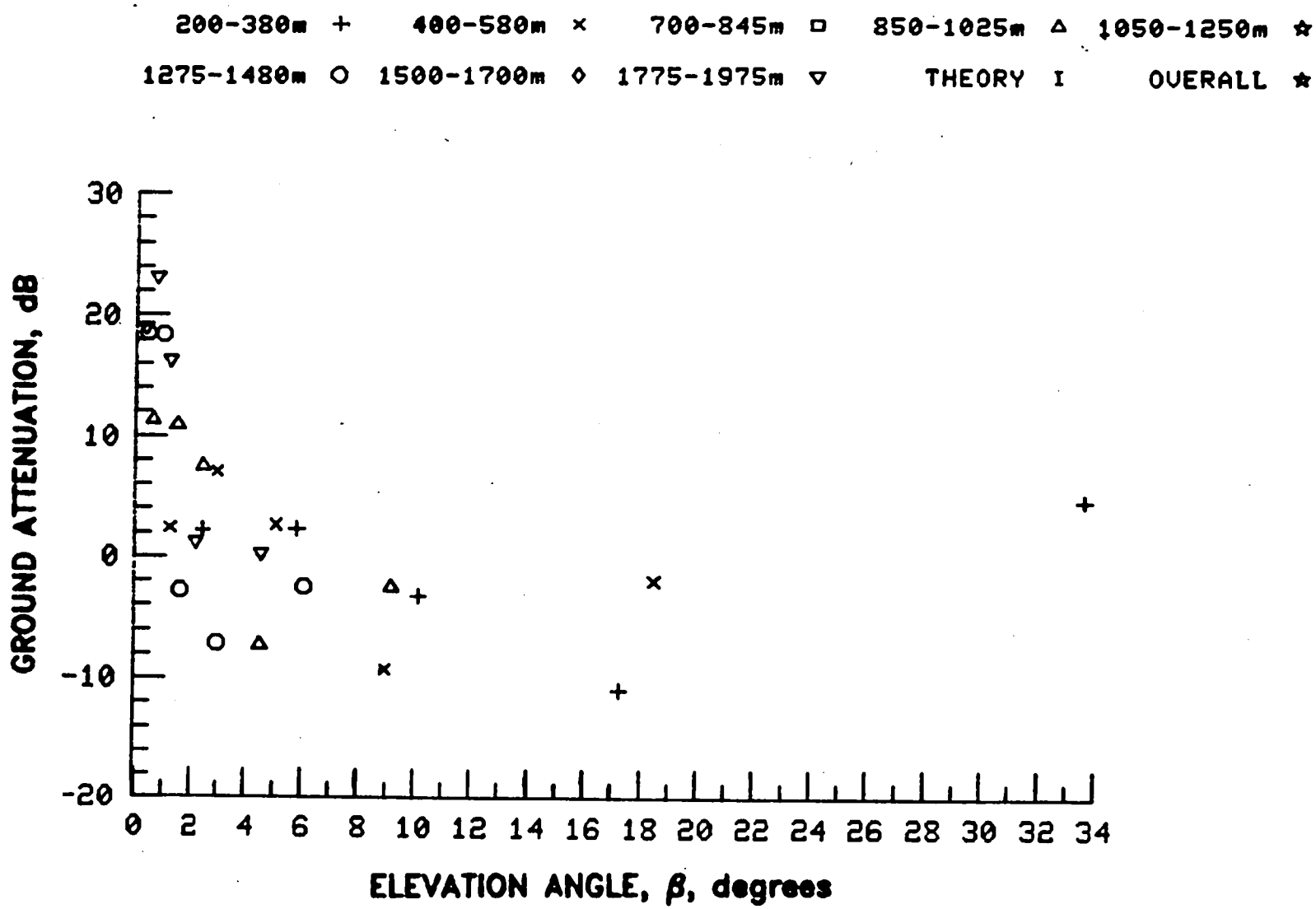


FIGURE 12. b. NEAR / FAR RESULTS FOR 126 Hz 1/3 OCTAVE BAND.

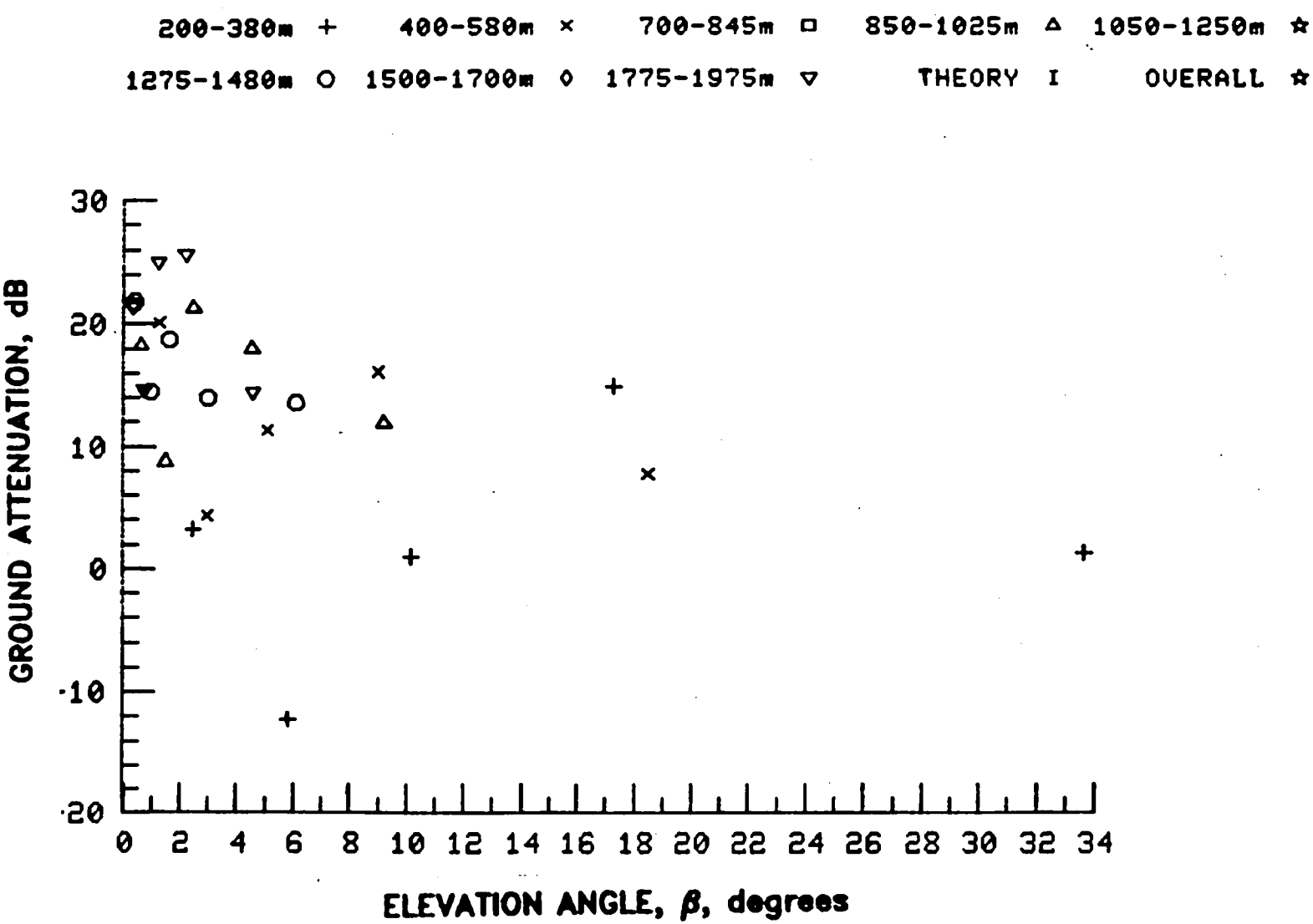


FIGURE 12. c. NEAR / FAR RESULTS FOR 251 Hz 1/3 OCTAVE BAND.

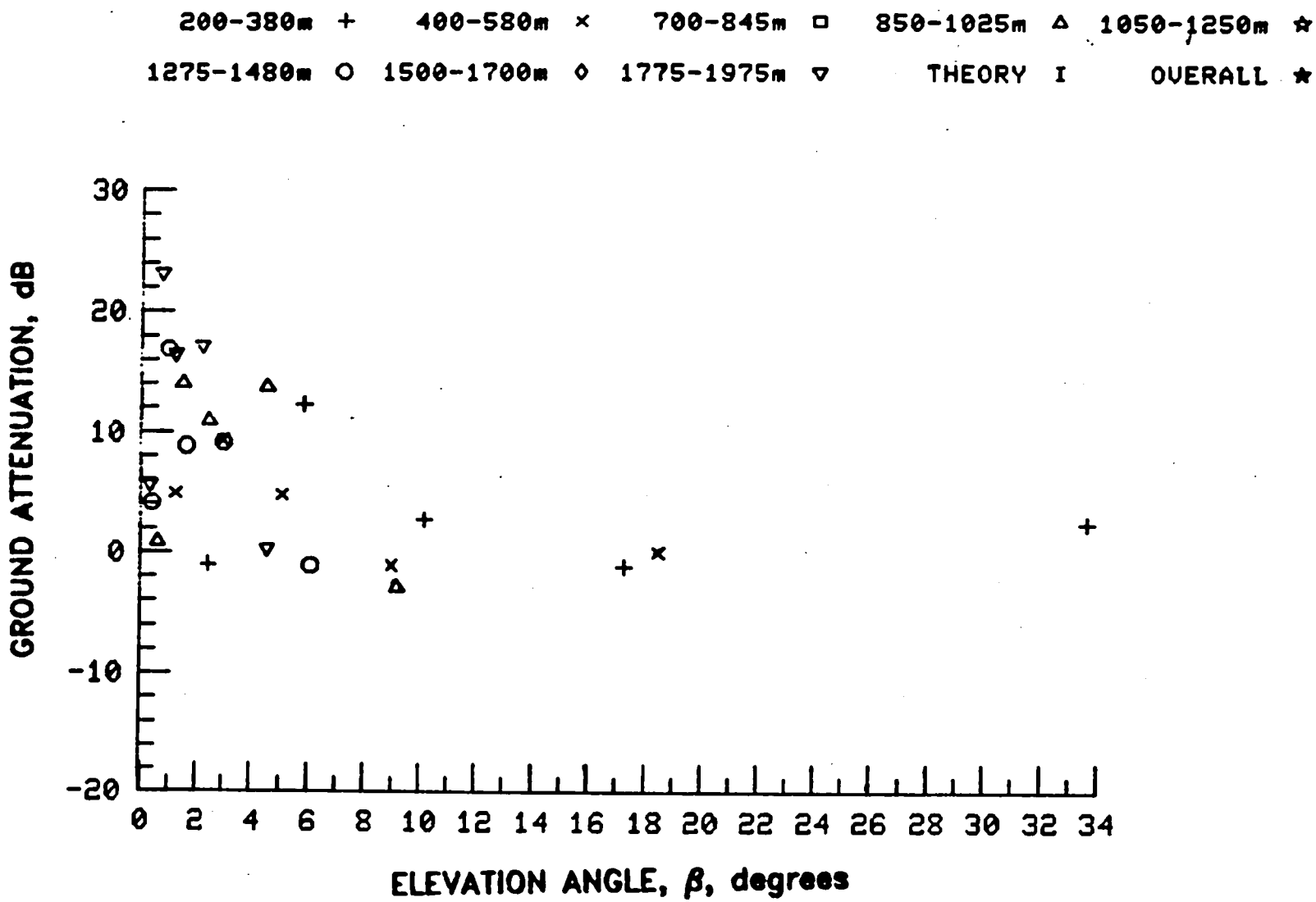


FIGURE 12. d. NEAR / FAR RESULTS FOR 501 Hz 1/3 OCTAVE BAND.

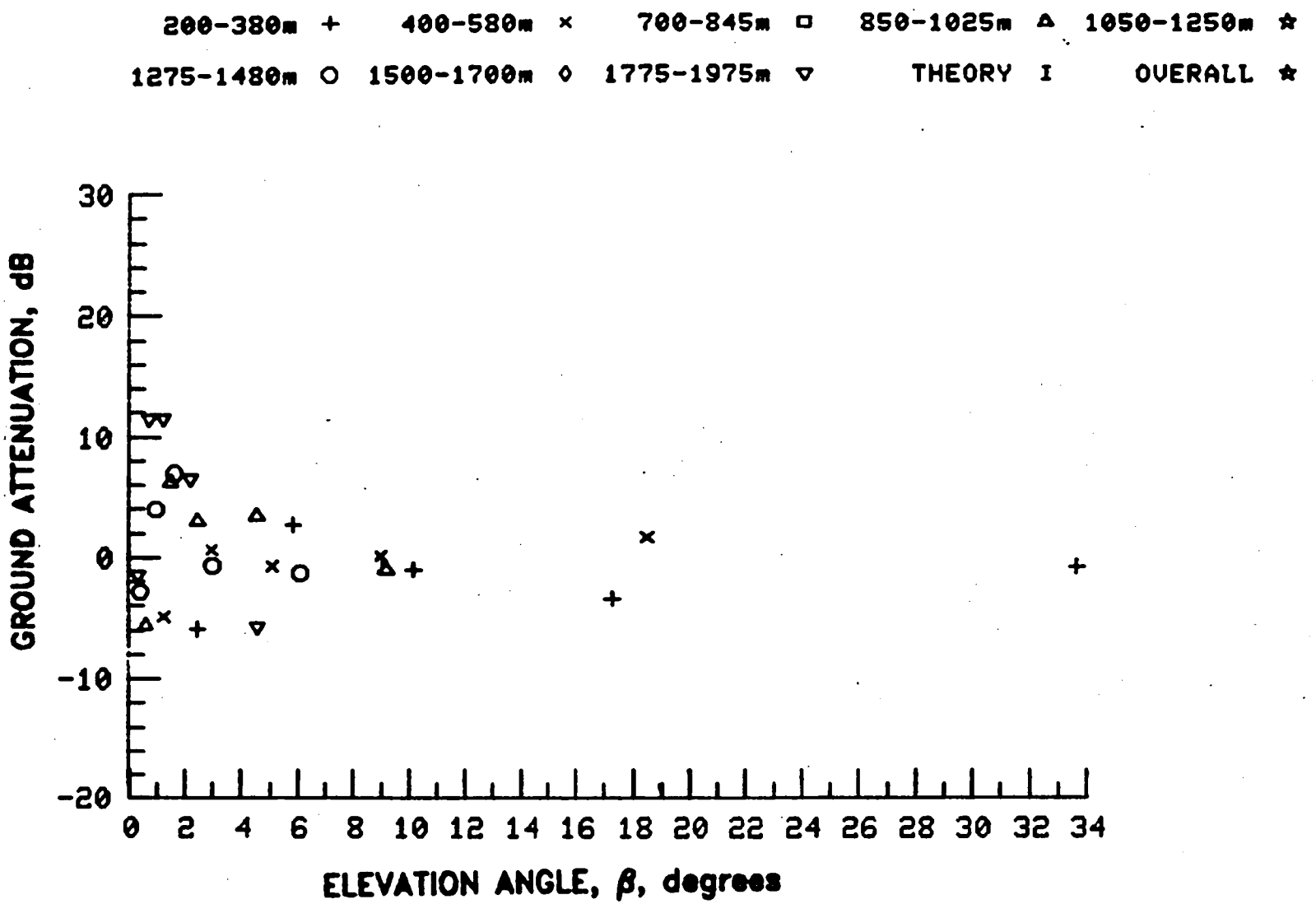


FIGURE 12. e. NEAR / FAR RESULTS FOR 1000 Hz 1/3 OCTAVE BAND.

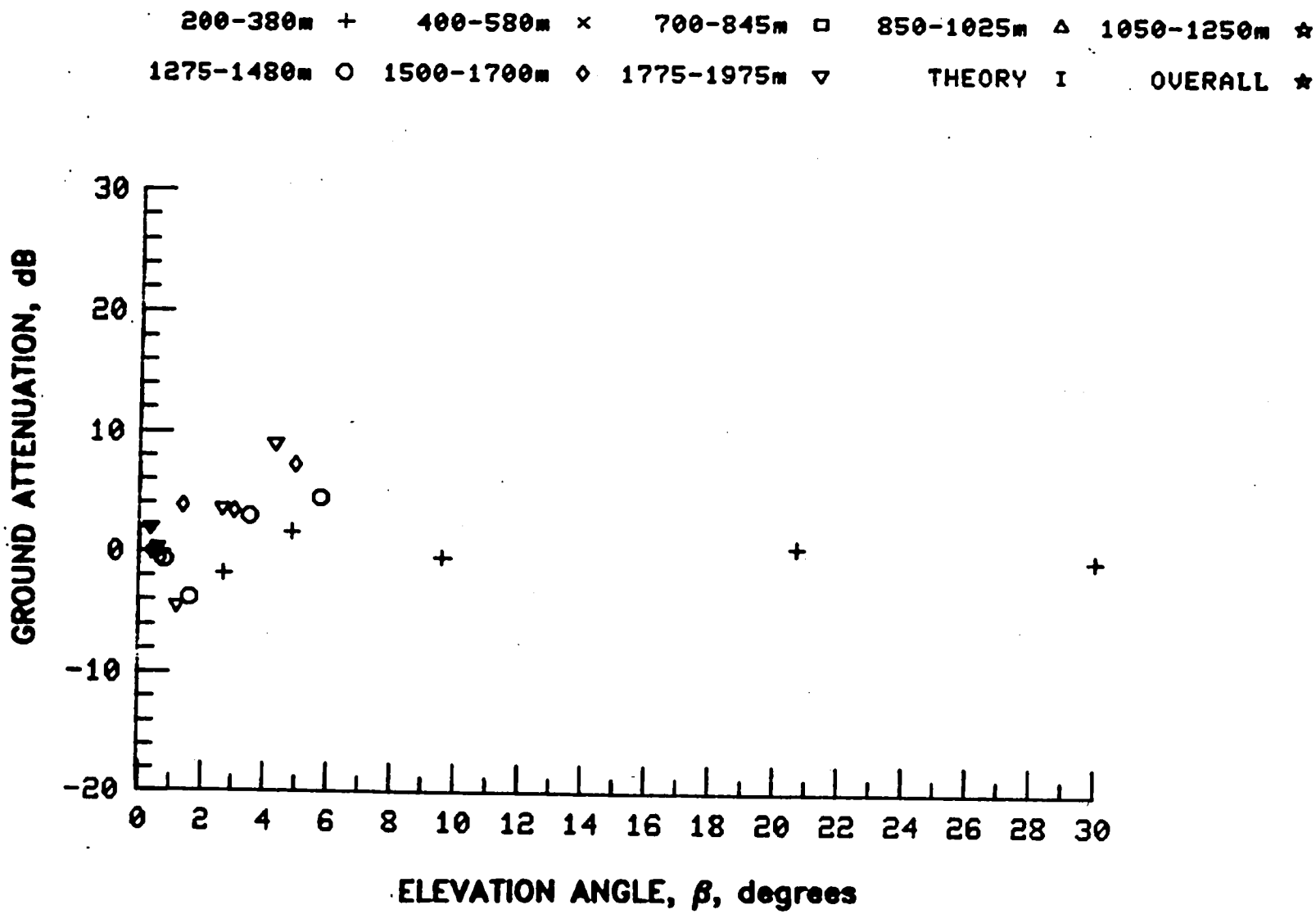


FIGURE 13. a. DIRECT COMPARISON RESULTS FOR 63 Hz 1/3 OCTAVE BAND.

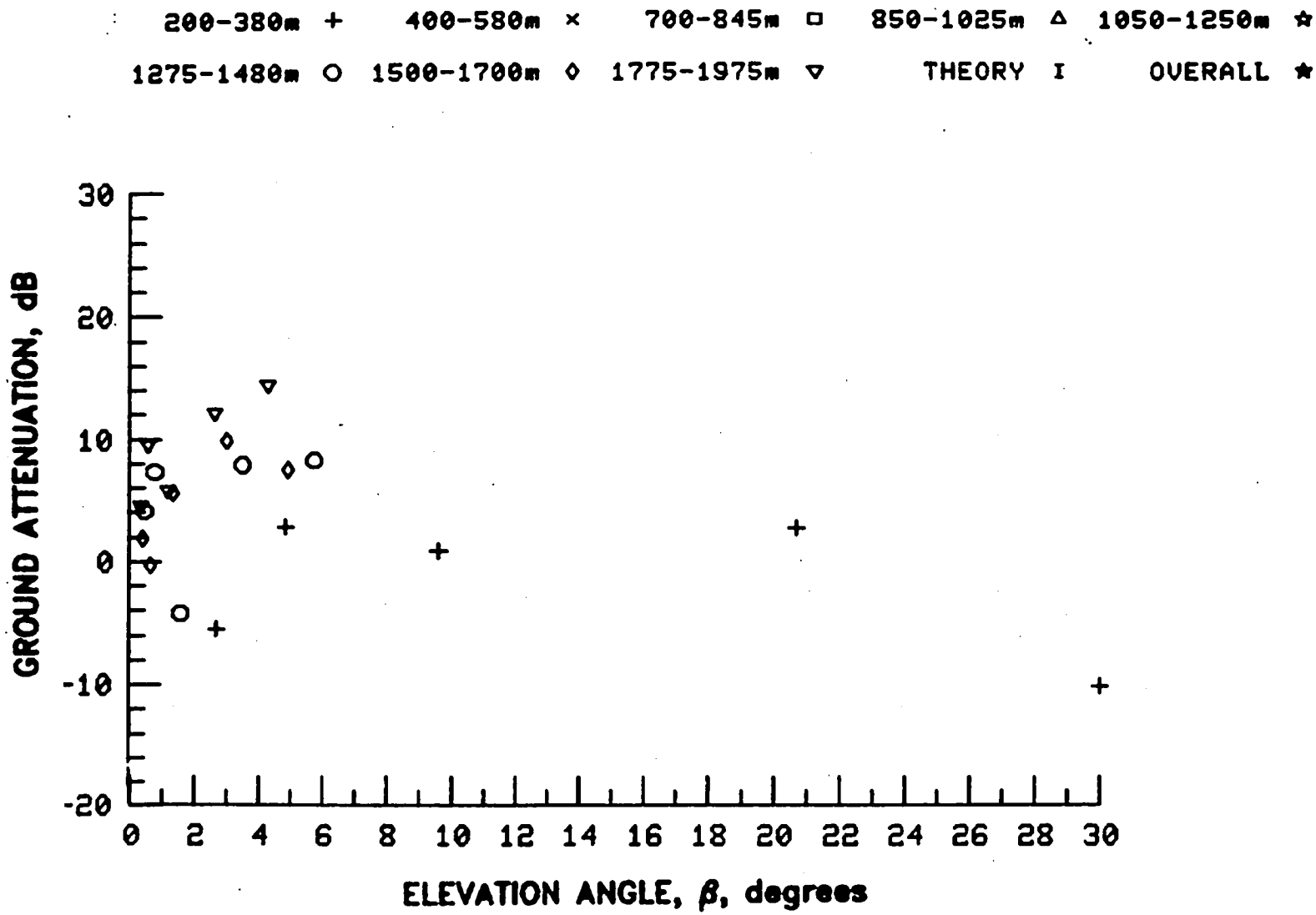


FIGURE 13. b. DIRECT COMPARISON RESULTS FOR 126 Hz 1/3 OCTAVE BAND.

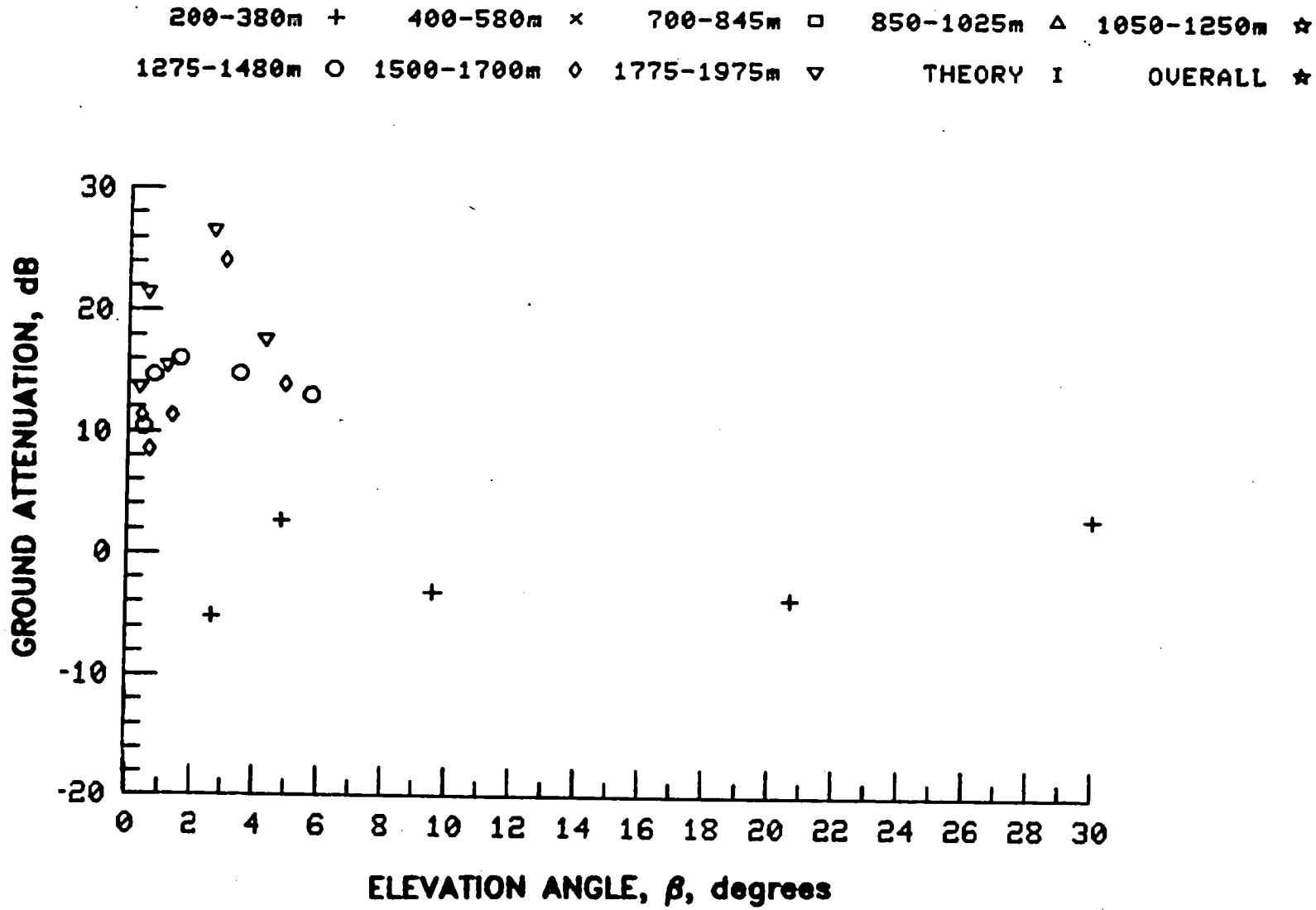


FIGURE 13. c. DIRECT COMPARISON RESULTS FOR 251 Hz 1/3 OCTAVE BAND.

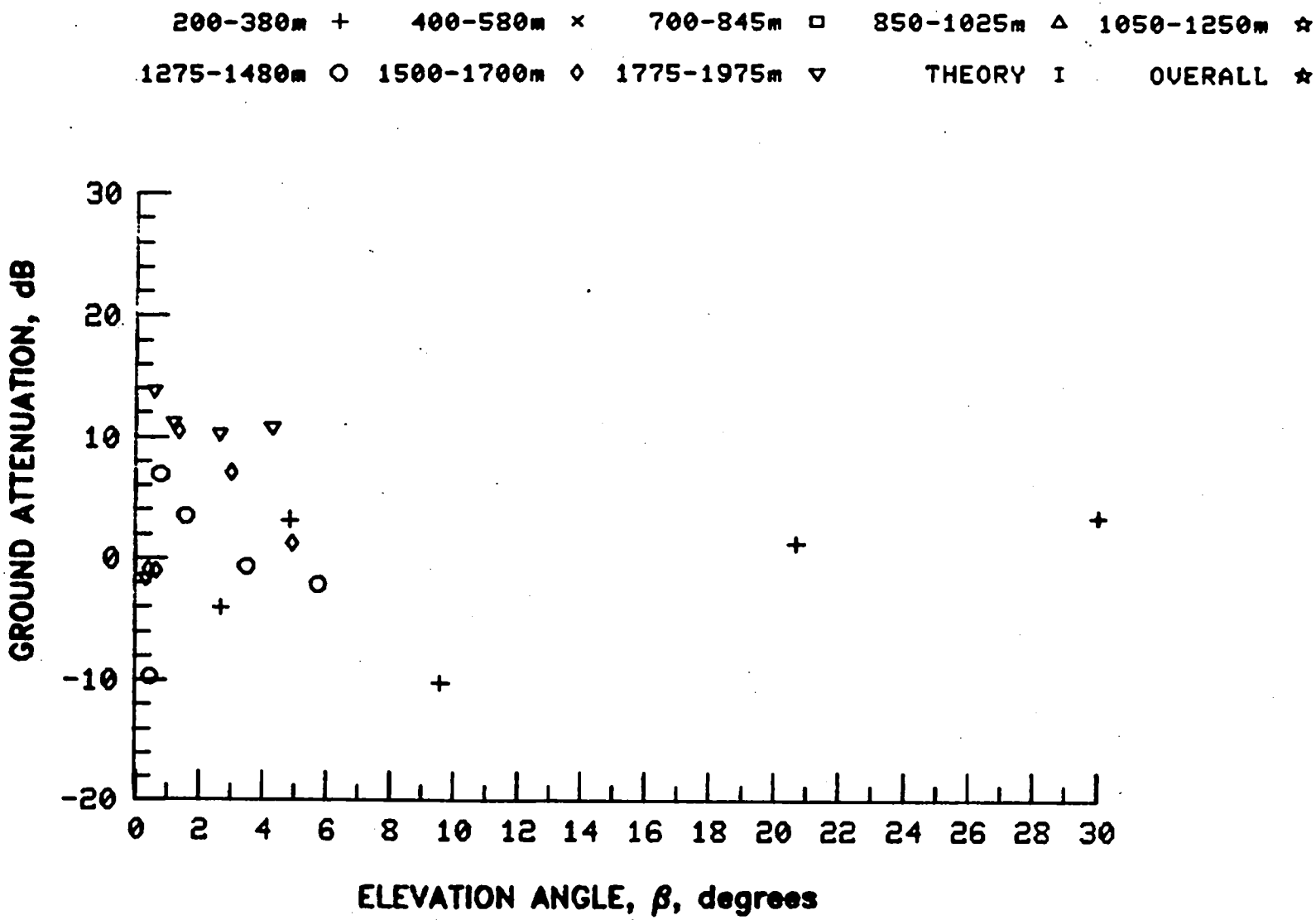


FIGURE 13. d. DIRECT COMPARISON RESULTS FOR 501 Hz 1/3 OCTAVE BAND.

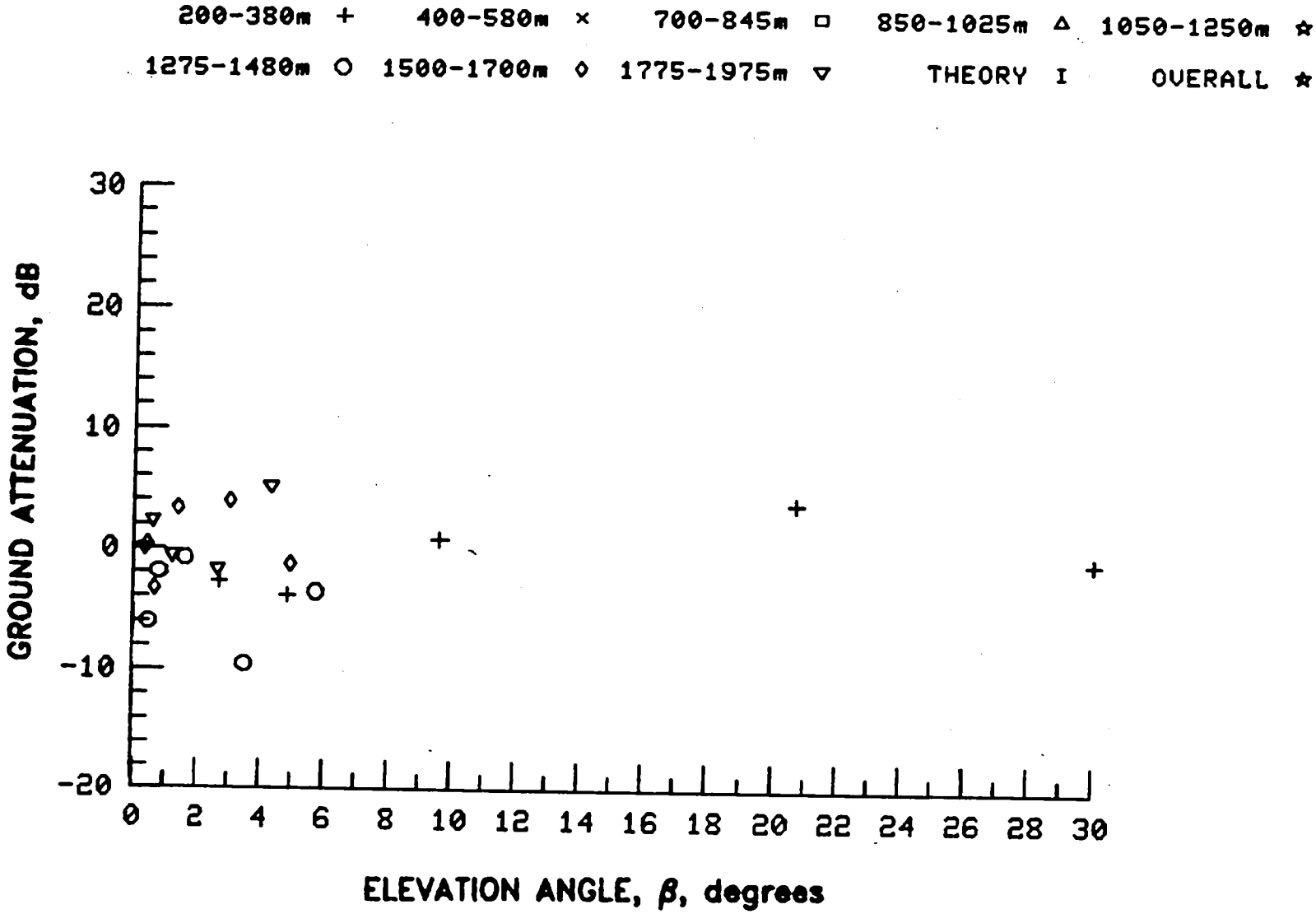


FIGURE 13. e. DIRECT COMPARISON RESULTS FOR 1000 Hz 1/3 OCTAVE BAND.

APPENDIX A: FLIGHT DATA

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X (m)	Y (m)	Z (m)	VEL (m/s)	HEADING (deg)
EGFR01.M01	11:46:38.07	-31.1	50.0	11.9	89.6	99.6
EGFR01.M02	11:46:38.07	-31.1	50.0	11.9	89.6	99.6
EGFR01.M03	11:46:38.07	-31.2	50.1	11.9	89.6	99.6
EGFR01.M04	11:46:38.11	-29.2	46.9	11.9	89.6	99.6
EGFR01.M05	11:46:38.16	-26.5	42.5	11.9	89.6	99.6
EGFR01.M06	11:46:37.86	-41.1	66.1	11.9	89.6	99.6
EGFR01.M07	11:46:37.90	-39.0	62.8	11.9	89.6	99.6
EGFR01.M08	11:46:37.95	-36.8	59.3	11.9	89.6	99.6
EGFR01.M09	11:46:37.99	-34.8	56.0	11.9	89.6	99.6
EGFR01.M10	11:46:38.04	-32.6	52.4	11.9	89.6	99.6
EGFR01.M11	11:46:38.04	-32.6	52.4	11.9	89.6	99.6
EGFR01.M12	11:46:38.04	-32.6	52.3	11.9	89.6	99.6
EGFR01.M18	11:46:39.00	12.5	-20.7	12.0	89.6	99.6
EGFR01.M19	11:46:39.04	14.5	-24.0	12.0	89.6	99.6
EGFR01.M20	11:46:39.09	16.7	-27.6	12.0	89.6	99.6

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y	Z	VEL	HEADING
		(m)			(m/s)	(deg)
EGFR02.M01	11:54:27.57	-27.4	50.0	11.8	88.5	99.6
EGFR02.M02	11:54:27.57	-27.3	50.0	11.8	88.5	99.6
EGFR02.M03	11:54:27.57	-27.4	50.1	11.8	88.5	99.6
EGFR02.M04	11:54:27.61	-25.4	46.8	11.8	88.5	99.6
EGFR02.M05	11:54:27.67	-22.8	42.5	11.8	88.5	99.6
EGFR02.M06	11:54:27.36	-37.3	66.1	11.8	88.5	99.6
EGFR02.M07	11:54:27.40	-35.3	62.8	11.8	88.5	99.6
EGFR02.M08	11:54:27.45	-33.1	59.2	11.8	88.5	99.6
EGFR02.M09	11:54:27.49	-31.1	56.0	11.8	88.5	99.6
EGFR02.M10	11:54:27.54	-28.9	52.4	11.8	88.5	99.6
EGFR02.M11	11:54:27.54	-28.8	52.4	11.8	88.5	99.6
EGFR02.M12	11:54:27.54	-28.8	52.3	11.8	88.5	99.6
EGFR02.M13	11:54:28.29	5.8	-3.8	11.9	88.5	99.6
EGFR02.M14	11:54:28.29	5.8	-3.9	11.9	88.5	99.6
EGFR02.M15	11:54:28.28	5.8	-3.8	11.9	88.5	99.6
EGFR02.M16	11:54:28.29	6.0	-4.2	11.9	88.5	99.6
EGFR02.M17	11:54:28.29	6.2	-4.5	11.9	88.5	99.6
EGFR02.M18	11:54:28.51	16.2	-20.7	11.9	88.5	99.6
EGFR02.M19	11:54:28.55	18.2	-24.0	11.9	88.5	99.6
EGFR02.M20	11:54:28.60	20.5	-27.6	11.9	88.5	99.6

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y	Z	VEL	HEADING
			(m)		(m/s)	(deg)
EGFR03.M01	11:58:54.52	-29.8	49.3	11.9	89.4	99.7
EGFR03.M02	11:58:54.52	-29.8	49.3	11.9	89.4	99.7
EGFR03.M03	11:58:54.52	-29.9	49.4	11.9	89.4	99.7
EGFR03.M04	11:58:54.57	-27.5	45.5	11.9	89.4	99.7
EGFR03.M05	11:58:54.64	-24.3	40.2	11.9	89.4	99.7
EGFR03.M06	11:58:54.34	-38.4	63.3	11.9	89.4	99.7
EGFR03.M07	11:58:54.39	-36.0	59.3	11.9	89.4	99.7
EGFR03.M08	11:58:54.45	-33.3	55.0	11.9	89.4	99.7
EGFR03.M09	11:58:54.50	-30.9	51.0	11.9	89.4	99.7
EGFR03.M10	11:58:54.55	-28.2	46.7	11.9	89.4	99.7
EGFR03.M11	11:58:54.55	-28.2	46.6	11.9	89.4	99.7
EGFR03.M12	11:58:54.55	-28.2	46.6	11.9	89.4	99.7
EGFR03.M13	11:58:55.23	3.2	-4.6	11.9	89.4	99.7
EGFR03.M14	11:58:55.23	3.2	-4.6	11.9	89.4	99.7
EGFR03.M15	11:58:55.23	3.1	-4.5	11.9	89.4	99.7
EGFR03.M16	11:58:55.24	3.7	-5.4	11.9	89.4	99.7
EGFR03.M17	11:58:55.24	3.8	-5.6	11.9	89.4	99.7
EGFR03.M18	11:58:55.50	15.7	-25.2	11.9	89.4	99.7
EGFR03.M19	11:58:55.55	18.4	-28.9	11.9	93.2	96.2
EGFR03.M20	11:58:55.60	21.4	-33.2	11.9	93.2	96.2

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X (m)	Y (m)	Z (m)	VEL (m/s)	HEADING (deg)
EGFR04,M01	12: 2:47.68	-40.6	46.5	12.9	89.2	100.6
EGFR04,M02	12: 2:47.68	-40.6	46.4	12.9	89.2	100.6
EGFR04,M03	12: 2:47.68	-40.7	46.5	12.9	89.2	100.6
EGFR04,M04	12: 2:47.78	-36.4	39.4	12.9	89.2	100.6
EGFR04,M05	12: 2:47.90	-30.7	29.8	12.9	89.2	100.6
EGFR04,M06	12: 2:47.63	-43.0	50.5	12.9	89.2	100.6
EGFR04,M07	12: 2:47.73	-38.7	43.2	12.9	89.2	100.6
EGFR04,M08	12: 2:47.83	-34.0	35.2	12.9	89.2	100.6
EGFR04,M09	12: 2:47.93	-29.7	28.0	12.9	89.2	100.6
EGFR04,M10	12: 2:48.03	-25.0	20.0	12.9	91.1	100.9
EGFR04,M11	12: 2:48.03	-24.9	19.9	12.9	91.1	100.9
EGFR04,M12	12: 2:48.03	-24.9	19.8	12.9	91.1	100.9
EGFR04,M13	12: 2:48.38	-8.6	-7.9	12.5	91.1	100.9
EGFR04,M14	12: 2:48.38	-8.6	-8.0	12.5	91.1	100.9
EGFR04,M15	12: 2:48.38	-8.6	-7.9	12.5	91.1	100.9
EGFR04,M16	12: 2:48.47	-4.7	-14.6	12.4	91.1	100.9
EGFR04,M17	12: 2:48.47	-4.6	-14.8	12.4	91.1	100.9
EGFR04,M18	12: 2:48.97	18.2	-53.8	11.8	91.1	100.9
EGFR04,M19	12: 2:49.07	23.2	-62.3	11.6	91.1	100.9
EGFR04,M20	12: 2:49.20	28.8	-71.9	11.5	91.1	100.9

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y (m)	Z	VEL (m/s)	HEADING (deg)
EGFR05.M01	12: 6:59.17	-23.8	50.8	12.4	91.8	99.3
EGFR05.M02	12: 6:59.17	-23.8	50.8	12.4	91.8	99.3
EGFR05.M03	12: 6:59.17	-23.9	50.9	12.4	91.8	99.3
EGFR05.M04	12: 6:59.20	-22.4	48.5	12.4	91.8	99.3
EGFR05.M05	12: 6:59.24	-20.5	45.4	12.4	91.8	99.3
EGFR05.M06	12: 6:58.93	-35.6	69.7	12.4	91.8	99.3
EGFR05.M07	12: 6:58.96	-34.1	67.3	12.4	91.8	99.3
EGFR05.M08	12: 6:59.00	-32.5	64.7	12.4	91.8	99.3
EGFR05.M09	12: 6:59.02	-31.0	62.3	12.4	91.8	99.3
EGFR05.M10	12: 6:59.06	-29.4	59.7	12.4	91.8	99.3
EGFR05.M11	12: 6:59.06	-29.4	59.7	12.4	91.8	99.3
EGFR05.M12	12: 6:59.06	-29.3	59.7	12.4	91.8	99.3
EGFR05.M13	12: 6:59.86	9.6	-2.9	12.4	91.8	99.3
EGFR05.M14	12: 6:59.86	9.6	-2.9	12.4	91.8	99.3
EGFR05.M15	12: 6:59.86	9.5	-2.8	12.4	91.8	99.3
EGFR05.M16	12: 6:59.87	9.8	-3.3	12.4	91.8	99.3
EGFR05.M17	12: 6:59.87	10.0	-3.6	12.4	91.8	99.3
EGFR05.M18	12: 7: 0.02	17.2	-15.1	12.4	91.8	99.3
EGFR05.M19	12: 7: 0.05	18.6	-17.4	12.4	91.8	99.3
EGFR05.M20	12: 7: 0.08	20.3	-20.1	12.4	91.8	99.3

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y	Z	VEL	HEADING
		(m)			(m/s)	(deg)
EGFR06.M01	19:37:37.79	-24.5	51.8	13.1	90.7	99.0
EGFR06.M02	19:37:37.79	-24.5	51.8	13.1	90.7	99.0
EGFR06.M03	19:37:37.79	-24.6	52.0	13.1	90.7	99.0
EGFR06.M04	19:37:37.80	-23.7	50.7	13.1	90.7	99.0
EGFR06.M05	19:37:37.83	-22.7	49.0	13.1	90.7	99.0
EGFR06.M06	19:37:37.50	-38.4	74.0	13.1	90.7	99.0
EGFR06.M07	19:37:37.52	-37.6	72.7	13.1	90.7	99.0
EGFR06.M08	19:37:37.53	-36.7	71.3	13.1	90.7	99.0
EGFR06.M09	19:37:37.55	-35.9	70.0	13.1	90.7	99.0
EGFR06.M10	19:37:37.45	-13.4	80.5	17.0	86.4	105.5
EGFR06.M11	19:37:37.45	-13.4	80.5	17.0	86.4	105.5
EGFR06.M12	19:37:37.45	-13.4	80.5	17.0	86.4	105.5
EGFR06.M13	19:37:38.48	9.2	-1.7	13.2	90.7	99.0
EGFR06.M14	19:37:38.48	9.2	-1.7	13.2	90.7	99.0
EGFR06.M15	19:37:38.48	9.1	-1.5	13.2	90.7	99.0
EGFR06.M16	19:37:38.51	10.3	-3.5	13.2	90.7	99.0
EGFR06.M17	19:37:38.52	10.5	-3.8	13.2	90.7	99.0
EGFR06.M18	19:37:38.57	13.3	-8.3	13.2	90.7	99.0
EGFR06.M19	19:37:38.59	14.1	-9.5	13.2	90.7	99.0
EGFR06.M20	19:37:38.61	15.0	-11.0	13.2	90.7	99.0

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y (m)	Z	VEL (m/s)	HEADING (deg)
EGFR07.M01	19:42:47.95	-28.7	50.8	6.9	92.8	99.4
EGFR07.M02	19:42:47.95	-28.7	50.8	6.9	92.8	99.4
EGFR07.M03	19:42:47.95	-28.7	50.8	6.9	92.8	99.4
EGFR07.M04	19:42:47.98	-27.2	48.4	6.9	92.8	99.4
EGFR07.M05	19:42:48.02	-25.1	45.0	6.9	92.8	99.4
EGFR07.M06	19:42:47.72	-40.1	69.2	6.9	92.8	99.4
EGFR07.M07	19:42:47.75	-38.5	66.6	6.9	92.8	99.4
EGFR07.M08	19:42:47.78	-36.8	63.9	6.9	92.8	99.4
EGFR07.M09	19:42:47.82	-35.3	61.4	6.9	92.8	99.4
EGFR07.M10	19:42:47.85	-33.6	58.6	6.9	92.8	99.4
EGFR07.M11	19:42:47.85	-33.5	58.6	6.9	92.8	99.4
EGFR07.M12	19:42:47.85	-33.5	58.5	6.9	92.8	99.4
EGFR07.M13	19:42:48.63	4.6	-2.9	6.9	92.8	99.4
EGFR07.M14	19:42:48.63	4.7	-2.9	6.9	92.8	99.4
EGFR07.M15	19:42:48.63	4.6	-2.9	6.9	92.8	99.4
EGFR07.M16	19:43: 3.66				102.1	71.9
EGFR07.M17	19:43: 3.66				102.1	71.9
EGFR07.M18	19:42:48.80	12.8	-15.9	6.9	92.8	99.4
EGFR07.M19	19:42:48.83	14.3	-18.4	6.9	92.8	99.4
EGFR07.M20	19:42:48.87	16.0	-21.2	6.9	92.8	99.4

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y	Z	VEL	HEADING
		(m)			(m/s)	(deg)
EGFR08.M01	19:48:45.80	-30.0	50.5	8.3	93.6	99.4
EGFR08.M02	19:48:45.80	-30.0	50.5	8.3	93.6	99.4
EGFR08.M03	19:48:45.79	-30.0	50.5	8.3	93.6	99.4
EGFR08.M04	19:48:45.83	-28.3	47.7	8.3	93.6	99.4
EGFR08.M05	19:48:45.88	-26.0	44.0	8.3	93.6	99.4
EGFR08.M06	19:48:45.58	-40.8	67.9	8.3	93.6	99.4
EGFR08.M07	19:48:45.61	-39.0	65.0	8.3	93.6	99.4
EGFR08.M08	19:48:45.65	-37.1	61.9	8.3	93.6	99.4
EGFR08.M09	19:48:45.69	-35.3	59.1	8.3	93.6	99.4
EGFR08.M10	19:48:45.73	-33.4	55.9	8.3	93.6	99.4
EGFR08.M11	19:48:45.73	-33.4	55.9	8.3	93.6	99.4
EGFR08.M12	19:48:45.73	-33.3	55.9	8.3	93.6	99.4
EGFR08.M13	19:48:46.47	3.3	-3.3	8.3	93.6	99.4
EGFR08.M14	19:48:46.47	3.3	-3.3	8.3	93.6	99.4
EGFR08.M15	19:48:46.47	3.3	-3.2	8.3	93.6	99.4
EGFR08.M16	19:48:46.47	3.2	-3.1	8.3	93.6	99.4
EGFR08.M17	19:48:46.47	3.3	-3.3	8.3	93.6	99.4
EGFR08.M18	19:48:46.66	12.4	-18.0	8.3	93.6	99.4
EGFR08.M19	19:48:46.69	14.1	-20.8	8.3	93.6	99.4
EGFR08.M20	19:48:46.73	16.1	-24.0	8.3	93.6	99.4

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y (m)	Z	VEL (m/s)	HEADING (deg)
EGFR09.M01	19:52:38.40	-28.9	50.1	5.7	93.4	99.6
EGFR09.M02	19:52:38.40	-28.9	50.1	5.7	93.4	99.6
EGFR09.M03	19:52:38.40	-28.9	50.1	5.7	93.4	99.6
EGFR09.M04	19:52:38.44	-26.9	46.9	5.7	93.4	99.6
EGFR09.M05	19:52:38.49	-24.3	42.6	5.7	93.4	99.6
EGFR09.M06	19:52:38.20	-38.8	66.2	5.7	93.4	99.6
EGFR09.M07	19:52:38.23	-36.8	62.9	5.7	93.4	99.6
EGFR09.M08	19:52:38.28	-34.6	59.4	5.7	93.4	99.6
EGFR09.M09	19:52:38.32	-32.6	56.1	5.7	93.4	99.6
EGFR09.M10	19:52:38.37	-30.4	52.5	5.7	93.4	99.6
EGFR09.M11	19:52:38.37	-30.4	52.5	5.7	93.4	99.6
EGFR09.M12	19:52:38.37	-30.4	52.5	5.7	93.4	99.6
EGFR09.M13	19:52:39.08	4.3	-3.7	5.6	93.4	99.6
EGFR09.M14	19:52:39.08	4.3	-3.7	5.6	93.4	99.6
EGFR09.M15	19:52:39.08	4.3	-3.7	5.6	93.4	99.6
EGFR09.M16	19:52:39.05	2.9	-1.4	5.6	93.4	99.6
EGFR09.M17	19:52:39.05	3.0	-1.7	5.6	93.4	99.6
EGFR09.M18	19:52:38.53	-3.6	44.4	9.9	90.3	104.6
EGFR09.M19	19:52:39.33	16.7	-23.8	5.5	93.4	99.6
EGFR09.M20	19:52:39.38	18.9	-27.5	5.5	93.4	99.6

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y (m)	Z	VEL (m/s)	HEADING (deg)
EGFR10.M01	19:56:24.14	-27.2	50.7	18.5	93.4	99.3
EGFR10.M02	19:56:24.14	-27.2	50.7	18.5	93.4	99.3
EGFR10.M03	19:56:24.13	-27.4	51.0	18.5	93.4	99.3
EGFR10.M04	19:56:24.16	-26.0	48.7	18.5	93.4	99.3
EGFR10.M05	19:56:24.20	-24.2	45.8	18.5	93.4	99.3
EGFR10.M06	19:56:23.89	-39.4	70.2	18.5	93.4	99.3
EGFR10.M07	19:56:23.92	-37.9	67.9	18.5	93.4	99.3
EGFR10.M08	19:56:23.95	-36.4	65.5	18.5	93.4	99.3
EGFR10.M09	19:56:23.98	-35.1	63.3	18.5	93.4	99.3
EGFR10.M10	19:56:24.02	-33.5	60.8	18.5	93.4	99.3
EGFR10.M11	19:56:24.02	-33.5	60.8	18.5	93.4	99.3
EGFR10.M12	19:56:24.02	-33.5	60.8	18.5	93.4	99.3
EGFR10.M13	19:56:24.82	6.2	-2.9	18.6	93.4	99.3
EGFR10.M14	19:56:24.82	6.2	-2.9	18.6	93.4	99.3
EGFR10.M15	19:56:24.81	6.0	-2.7	18.6	93.4	99.3
EGFR10.M16	19:56:24.88	9.0	-7.4	18.6	93.4	99.3
EGFR10.M17	19:56:24.88	9.1	-7.6	18.6	93.4	99.3
EGFR10.M18	19:56:24.96	13.2	-14.2	18.6	93.4	99.3
EGFR10.M19	19:56:24.98	14.6	-16.5	18.6	93.4	99.3
EGFR10.M20	19:56:25.02	16.2	-18.9	18.6	93.4	99.3

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X (m)	Y (m)	Z (m)	VEL (m/s)	HEADING (deg)
EGFR11.M01	20: 0: 2.09	-33.9	48.5	21.2	94.1	99.9
EGFR11.M02	20: 0: 2.09	-33.9	48.5	21.2	94.1	99.9
EGFR11.M03	20: 0: 2.09	-34.1	48.8	21.2	94.1	99.9
EGFR11.M04	20: 0: 2.14	-31.4	44.4	21.2	94.1	99.9
EGFR11.M05	20: 0: 2.21	-27.9	38.7	21.1	94.1	99.9
EGFR11.M06	20: 0: 1.92	-41.8	61.5	21.2	94.1	99.9
EGFR11.M07	20: 0: 1.98	-39.1	57.0	21.2	94.1	99.9
EGFR11.M08	20: 0: 2.04	-36.1	52.2	21.2	94.1	99.9
EGFR11.M09	20: 0: 2.09	-33.5	47.8	21.2	94.1	99.9
EGFR11.M10	20: 0: 2.16	-30.5	42.9	21.2	94.1	99.9
EGFR11.M11	20: 0: 2.16	-30.5	42.9	21.2	94.1	99.9
EGFR11.M12	20: 0: 2.16	-30.4	42.9	21.2	94.1	99.9
EGFR11.M13	20: 0: 2.76	-1.0	-5.4	21.1	94.1	99.9
EGFR11.M14	20: 0: 2.76	-1.0	-5.4	21.1	94.1	99.9
EGFR11.M15	20: 0: 2.76	-1.2	-5.1	21.1	94.1	99.9
EGFR11.M16	20: 0: 2.85	3.4	-12.7	21.1	94.1	99.9
EGFR11.M17	20: 0: 2.85	3.6	-12.9	21.1	94.1	99.9
EGFR11.M18	20: 0: 3.04	12.8	-28.0	21.1	94.1	99.9
EGFR11.M19	20: 0: 3.09	15.4	-32.4	21.1	94.1	99.9
EGFR11.M20	20: 0: 3.16	18.4	-37.3	21.1	94.1	99.9

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X (m)	Y (m)	Z (m)	VEL (m/s)	HEADING (deg)
EGFR12.M01	20: 3:59.09	-29.2	50.1	22.3	95.4	99.4
EGFR12.M02	20: 3:59.09	-29.2	50.1	22.3	95.4	99.4
EGFR12.M03	20: 3:59.09	-29.5	50.5	22.3	95.4	99.4
EGFR12.M04	20: 3:59.13	-27.8	47.8	22.3	95.4	99.4
EGFR12.M05	20: 3:59.16	-25.7	44.4	22.3	95.4	99.4
EGFR12.M06	20: 3:58.87	-40.7	68.5	22.3	95.4	99.4
EGFR12.M07	20: 3:58.90	-39.0	65.9	22.3	95.4	99.4
EGFR12.M08	20: 3:58.94	-37.2	63.0	22.3	95.4	99.4
EGFR12.M09	20: 3:58.97	-35.6	60.4	22.3	95.4	99.4
EGFR12.M10	20: 3:59.01	-33.8	57.5	22.3	95.4	99.4
EGFR12.M11	20: 3:59.01	-33.8	57.4	22.3	95.4	99.4
EGFR12.M12	20: 3:59.01	-33.8	57.4	22.3	95.4	99.4
EGFR12.M13	20: 3:59.76	4.1	-3.6	22.4	95.4	99.4
EGFR12.M14	20: 3:59.76	4.0	-3.5	22.4	95.4	99.4
EGFR12.M15	20: 3:59.75	3.9	-3.2	22.4	95.4	99.4
EGFR12.M16	20: 3:59.84	8.3	-10.4	22.4	95.4	99.4
EGFR12.M17	20: 3:59.84	8.4	-10.6	22.4	95.4	99.4
EGFR12.M18	20: 3:59.92	12.3	-16.8	22.4	95.4	99.4
EGFR12.M19	20: 3:59.95	13.9	-19.5	22.4	95.4	99.4
EGFR12.M20	20: 3:59.99	15.7	-22.4	22.4	95.4	99.4

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X (m)	Y (m)	Z	VEL (m/s)	HEADING (deg)
EGFR13.M01	21: 2:30.04	-39.9	45.9	19.6	102.5	100.6
EGFR13.M02	21: 2:30.04	-39.9	45.9	19.6	102.5	100.6
EGFR13.M03	21: 2:30.04	-40.0	46.1	19.6	102.5	100.6
EGFR13.M04	21: 2:30.13	-35.7	38.7	19.6	102.5	100.6
EGFR13.M05	21: 2:30.23	-29.8	28.8	19.6	102.5	100.6
EGFR13.M06	21: 2:30.00	-42.0	49.4	19.6	102.5	100.6
EGFR13.M07	21: 2:30.09	-37.4	41.8	19.6	102.5	100.6
EGFR13.M08	21: 2:30.18	-32.6	33.6	19.6	102.5	100.6
EGFR13.M09	21: 2:30.27	-28.2	26.1	19.6	102.5	100.6
EGFR13.M10	21: 2:30.36	-23.3	17.8	19.7	102.5	100.6
EGFR13.M11	21: 2:30.36	-23.2	17.7	19.7	102.5	100.6
EGFR13.M12	21: 2:30.36	-23.2	17.6	19.7	102.5	100.6
EGFR13.M13	21: 2:30.66	-7.8	-8.4	19.7	102.5	100.6
EGFR13.M14	21: 2:30.66	-7.8	-8.5	19.7	102.5	100.6
EGFR13.M15	21: 2:30.66	-7.9	-8.3	19.7	102.5	100.6
EGFR13.M16	21: 2:30.76	-2.6	-17.2	19.7	102.5	100.6
EGFR13.M17	21: 2:30.76	-2.5	-17.4	19.7	102.5	100.6
EGFR13.M18	21: 2:31.10	15.2	-47.3	19.8	102.5	100.6
EGFR13.M19	21: 2:31.18	19.6	-54.7	19.8	102.5	100.6
EGFR13.M20	21: 2:31.28	24.5	-63.1	19.8	102.5	100.6

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X (m)	Y (m)	Z (m)	VEL (m/s)	HEADING (deg)
EGFR14.M01	21: 6:19.05	-27.6	50.4	20.7	92.0	99.3
EGFR14.M02	21: 6:19.05	-27.6	50.5	20.7	92.0	99.3
EGFR14.M03	21: 6:19.05	-27.8	50.8	20.7	92.0	99.3
EGFR14.M04	21: 6:19.08	-26.3	48.4	20.7	92.0	99.3
EGFR14.M05	21: 6:19.12	-24.5	45.4	20.7	92.0	99.3
EGFR14.M06	21: 6:18.80	-39.6	69.7	20.7	92.0	99.3
EGFR14.M07	21: 6:18.84	-38.1	67.3	20.7	92.0	99.3
EGFR14.M08	21: 6:18.87	-36.5	64.8	20.7	92.0	99.3
EGFR14.M09	21: 6:18.90	-35.1	62.4	20.7	92.0	99.3
EGFR14.M10	21: 6:18.93	-33.5	59.9	20.7	92.0	99.3
EGFR14.M11	21: 6:18.93	-33.4	59.8	20.7	92.0	99.3
EGFR14.M12	21: 6:18.93	-33.4	59.8	20.7	92.0	99.3
EGFR14.M13	21: 6:19.73	5.8	-3.2	20.7	92.0	99.3
EGFR14.M14	21: 6:19.73	5.8	-3.2	20.7	92.0	99.3
EGFR14.M15	21: 6:19.73	5.6	-2.9	20.7	92.0	99.3
EGFR14.M16	21: 6:19.80	9.2	-8.8	20.7	92.0	99.3
EGFR14.M17	21: 6:19.81	9.4	-9.0	20.7	92.0	99.3
EGFR14.M18	21: 6:19.89	13.1	-15.0	20.7	92.0	99.3
EGFR14.M19	21: 6:19.91	14.6	-17.3	20.7	92.0	99.3
EGFR14.M20	21: 6:19.95	16.2	-19.9	20.7	92.0	99.3

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y (m)	Z	VEL (m/s)	HEADING (deg)
EGFR15.M01	21: 9:53.39	-39.3	47.9	18.6	94.3	100.1
EGFR15.M02	21: 9:53.39	-39.3	47.9	18.6	94.3	100.1
EGFR15.M03	21: 9:53.39	-39.5	48.2	18.6	94.3	100.1
EGFR15.M04	21: 9:53.45	-36.3	42.9	18.6	94.3	100.1
EGFR15.M05	21: 9:53.54	-32.1	36.0	18.6	96.0	100.3
EGFR15.M06	21: 9:53.27	-45.6	58.3	18.7	94.3	100.1
EGFR15.M07	21: 9:53.33	-42.3	53.0	18.7	94.3	100.1
EGFR15.M08	21: 9:53.40	-38.9	47.2	18.6	94.3	100.1
EGFR15.M09	21: 9:53.47	-35.8	42.1	18.6	94.3	100.1
EGFR15.M10	21: 9:53.54	-32.3	36.3	18.6	96.0	100.3
EGFR15.M11	21: 9:53.54	-32.2	36.2	18.6	96.0	100.3
EGFR15.M12	21: 9:53.54	-32.2	36.2	18.6	96.0	100.3
EGFR15.M13	21: 9:54.06	-6.4	-6.9	18.8	96.0	100.3
EGFR15.M14	21: 9:54.06	-6.4	-6.9	18.8	96.0	100.3
EGFR15.M15	21: 9:54.06	-6.5	-6.7	18.8	96.0	100.3
EGFR15.M16	21: 9:54.16	-1.4	-15.2	18.8	96.0	100.3
EGFR15.M17	21: 9:54.16	-1.3	-15.4	18.8	96.0	100.3
EGFR15.M18	21: 9:54.45	12.5	-38.4	18.9	96.0	100.3
EGFR15.M19	21: 9:54.52	16.1	-44.5	19.0	96.0	100.3
EGFR15.M20	21: 9:54.60	20.2	-51.3	19.0	96.0	100.3

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y	Z	VEL	HEADING
		(m)			(m/s)	(deg)
EGFR16.M01	21:13:54.52	-42.4	45.5	37.7	95.3	100.4
EGFR16.M02	21:13:54.52	-42.4	45.6	37.7	95.3	100.4
EGFR16.M03	21:13:54.52	-42.8	46.3	37.7	95.3	100.4
EGFR16.M04	21:13:54.59	-39.2	40.3	37.7	95.3	100.4
EGFR16.M05	21:13:54.69	-34.3	32.1	37.7	95.3	100.4
EGFR16.M06	21:13:54.42	-47.2	53.5	37.6	95.3	100.4
EGFR16.M07	21:13:54.50	-43.3	47.0	37.6	95.3	100.4
EGFR16.M08	21:13:54.59	-39.1	40.1	37.7	95.3	100.4
EGFR16.M09	21:13:54.66	-35.3	33.7	37.7	95.3	100.4
EGFR16.M10	21:13:54.75	-31.1	26.6	37.8	95.3	100.4
EGFR16.M11	21:13:54.75	-31.0	26.5	37.8	95.3	100.4
EGFR16.M12	21:13:54.75	-31.0	26.5	37.8	95.3	100.4
EGFR16.M13	21:13:55.17	-10.1	-8.5	38.1	100.2	100.4
EGFR16.M14	21:13:55.17	-10.1	-8.5	38.1	100.2	100.4
EGFR16.M15	21:13:55.16	-10.5	-7.9	38.1	100.2	100.4
EGFR16.M16	21:13:55.40	1.3	-27.7	38.5	100.2	100.4
EGFR16.M17	21:13:55.40	1.4	-27.9	38.5	100.2	100.4
EGFR16.M18	21:13:55.55	8.9	-40.2	38.7	96.5	98.7
EGFR16.M19	21:13:55.62	12.9	-46.5	38.8	96.5	98.7
EGFR16.M20	21:13:56.52	56.0	-119.5	40.2	93.3	99.5

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y	Z	VEL	HEADING
			(m)		(m/s)	(deg)
EGFR17.M01	21:17:35.52	-33.3	47.4	39.3	96.3	99.7
EGFR17.M02	21:17:35.52	-33.4	47.5	39.3	96.3	99.7
EGFR17.M03	21:17:35.51	-33.9	48.3	39.3	96.3	99.7
EGFR17.M04	21:17:35.55	-31.8	44.9	39.2	96.3	99.7
EGFR17.M05	21:17:35.60	-29.0	40.4	39.2	96.3	99.7
EGFR17.M06	21:17:35.32	-43.4	63.8	39.3	96.3	99.7
EGFR17.M07	21:17:35.36	-41.1	60.1	39.3	96.3	99.7
EGFR17.M08	21:17:35.41	-38.7	56.1	39.3	96.3	99.7
EGFR17.M09	21:17:35.45	-36.4	52.5	39.3	96.3	99.7
EGFR17.M10	21:17:35.51	-33.9	48.4	39.3	96.3	99.7
EGFR17.M11	21:17:35.51	-33.9	48.3	39.3	96.3	99.7
EGFR17.M12	21:17:35.51	-33.9	48.4	39.3	96.3	99.7
EGFR17.M13	21:17:36.17	-0.4	-6.2	39.1	96.3	99.7
EGFR17.M14	21:17:36.17	-0.5	-6.1	39.1	96.3	99.7
EGFR17.M15	21:17:36.16	-0.9	-5.4	39.1	96.3	99.7
EGFR17.M16	21:17:36.37	9.5	-22.4	39.0	96.3	99.7
EGFR17.M17	21:17:36.37	9.7	-22.6	39.0	96.3	99.7
EGFR17.M18	21:17:36.38	10.5	-24.0	39.0	96.3	99.7
EGFR17.M19	21:17:36.43	12.7	-27.6	39.0	96.3	99.7
EGFR17.M20	21:17:36.48	15.2	-31.7	39.0	96.3	99.7

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y	Z	VEL	HEADING
			(m)		(m/s)	(deg)
EGFR18.M01	21:20:57.65	-31.0	47.3	37.8	96.9	99.7
EGFR18.M02	21:20:57.65	-31.0	47.4	37.8	96.9	99.7
EGFR18.M03	21:20:57.64	-31.5	48.2	37.8	96.9	99.7
EGFR18.M04	21:20:57.68	-29.3	44.6	37.8	96.9	99.7
EGFR18.M05	21:20:57.74	-26.5	39.9	37.7	96.9	99.7
EGFR18.M06	21:20:57.46	-40.7	63.2	37.9	96.9	99.7
EGFR18.M07	21:20:57.51	-38.4	59.4	37.9	96.9	99.7
EGFR18.M08	21:20:57.55	-35.9	55.3	37.8	96.9	99.7
EGFR18.M09	21:20:57.60	-33.6	51.5	37.8	96.9	99.7
EGFR18.M10	21:20:57.65	-31.0	47.3	37.8	96.9	99.7
EGFR18.M11	21:20:57.65	-31.0	47.3	37.8	96.9	99.7
EGFR18.M12	21:20:57.65	-31.0	47.4	37.8	96.9	99.7
EGFR18.M13	21:20:58.30	1.9	-6.3	37.4	96.9	99.7
EGFR18.M14	21:20:58.30	1.8	-6.2	37.4	96.9	99.7
EGFR18.M15	21:20:58.29	1.4	-5.6	37.4	96.9	99.7
EGFR18.M16	21:20:58.48	10.6	-20.6	37.3	96.9	99.7
EGFR18.M17	21:20:58.48	10.7	-20.8	37.3	96.9	99.7
EGFR18.M18	21:20:58.52	13.2	-24.8	37.3	96.9	99.7
EGFR18.M19	21:20:58.57	15.5	-28.6	37.2	96.9	99.7
EGFR18.M20	21:20:58.62	18.1	-32.8	37.2	96.9	99.7

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y	Z	VEL	HEADING
			(m)		(m/s)	(deg)
EGFR19.M01	21:25:57.80	-35.8	41.8	70.4	98.2	99.9
EGFR19.M02	21:25:57.80	-36.0	42.1	70.4	98.2	99.9
EGFR19.M03	21:25:57.78	-36.9	43.6	70.4	98.2	99.9
EGFR19.M04	21:25:57.81	-35.4	41.1	70.4	98.2	99.9
EGFR19.M05	21:25:57.87	-32.5	36.4	70.4	98.2	99.9
EGFR19.M06	21:25:57.59	-46.5	59.4	70.3	98.2	99.9
EGFR19.M07	21:25:57.64	-43.8	55.0	70.3	98.2	99.9
EGFR19.M08	21:25:57.70	-40.9	50.2	70.3	98.2	99.9
EGFR19.M09	21:25:57.75	-38.2	45.8	70.4	98.2	99.9
EGFR19.M10	21:25:57.81	-35.1	40.7	70.4	98.2	99.9
EGFR19.M11	21:25:57.81	-35.1	40.7	70.4	98.2	99.9
EGFR19.M12	21:25:57.81	-35.2	40.8	70.4	98.2	99.9
EGFR19.M13	21:25:58.43	-3.5	-11.3	70.6	98.2	99.9
EGFR19.M14	21:25:58.43	-3.7	-11.0	70.6	98.2	99.9
EGFR19.M15	21:25:58.41	-4.4	-9.7	70.6	98.2	99.9
EGFR19.M16	21:25:58.80	15.3	-42.3	70.7	98.2	99.9
EGFR19.M17	21:25:58.80	15.5	-42.5	70.7	98.2	99.9
EGFR19.M18	21:25:58.66	7.9	-30.0	70.6	98.2	99.9
EGFR19.M19	21:25:58.71	10.6	-34.5	70.7	98.2	99.9
EGFR19.M20	21:25:58.77	13.7	-39.6	70.7	98.2	99.9

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y	Z	VEL	HEADING
			(m)		(m/s)	(deg)
EGFR20.M01	21:29:39.57	-32.1	39.9	85.4	98.2	99.7
EGFR20.M02	21:29:39.56	-32.3	40.2	85.4	98.2	99.7
EGFR20.M03	21:29:39.55	-33.3	42.0	85.3	98.2	99.7
EGFR20.M04	21:29:39.55	-33.0	41.4	85.3	98.2	99.7
EGFR20.M05	21:29:39.59	-31.0	38.2	85.4	98.2	99.7
EGFR20.M06	21:29:39.30	-45.5	61.9	85.1	98.2	99.7
EGFR20.M07	21:29:39.35	-43.3	58.3	85.1	98.2	99.7
EGFR20.M08	21:29:39.40	-40.9	54.3	85.2	98.2	99.7
EGFR20.M09	21:29:39.44	-38.6	50.6	85.2	98.2	99.7
EGFR20.M10	21:29:39.49	-36.0	46.3	85.3	98.2	99.7
EGFR20.M11	21:29:39.49	-36.0	46.3	85.3	98.2	99.7
EGFR20.M12	21:29:39.49	-36.0	46.4	85.3	98.2	99.7
EGFR20.M13	21:29:40.20	0.2	-12.8	86.0	98.2	99.7
EGFR20.M14	21:29:40.20	0.0	-12.5	86.0	98.2	99.7
EGFR20.M15	21:29:40.17	-0.9	-11.0	86.0	98.2	99.7
EGFR20.M16	21:29:40.64	22.1	-48.6	86.1	87.7	99.9
EGFR20.M17	21:29:40.64	22.2	-48.8	86.1	87.7	99.9
EGFR20.M18	21:29:40.35	8.1	-25.8	86.2	98.2	99.7
EGFR20.M19	21:29:40.40	10.4	-29.5	86.2	98.2	99.7
EGFR20.M20	21:29:40.45	13.1	-33.8	86.3	98.2	99.7

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y	Z	VEL	HEADING
		(m)			(m/s)	(deg)
EGFR21.M01	21:33:13.24	-38.6	38.2	76.6	97.2	100.5
EGFR21.M02	21:33:13.24	-38.7	38.5	76.6	97.2	100.5
EGFR21.M03	21:33:13.22	-39.7	40.1	76.6	97.2	100.5
EGFR21.M04	21:33:13.27	-37.2	35.8	76.6	97.2	100.5
EGFR21.M05	21:33:13.37	-32.6	28.1	76.6	97.2	100.5
EGFR21.M06	21:33:13.11	-45.2	49.4	76.6	97.2	100.5
EGFR21.M07	21:33:13.20	-41.2	42.6	76.6	97.2	100.5
EGFR21.M08	21:33:13.28	-36.7	35.1	76.6	97.2	100.5
EGFR21.M09	21:33:13.36	-32.7	28.2	76.6	97.2	100.5
EGFR21.M10	21:33:13.45	-28.1	20.5	76.7	97.2	100.5
EGFR21.M11	21:33:13.45	-28.0	20.5	76.7	97.2	100.5
EGFR21.M12	21:33:13.45	-28.1	20.5	76.7	97.2	100.5
EGFR21.M13	21:33:13.88	-7.0	-15.1	76.8	97.2	100.5
EGFR21.M14	21:33:13.88	-7.1	-14.8	76.8	97.2	100.5
EGFR21.M15	21:33:13.86	-8.0	-13.4	76.8	97.2	100.5
EGFR21.M16	21:33:14.28	13.0	-48.7	76.9	97.2	100.5
EGFR21.M17	21:33:14.29	13.1	-48.9	76.9	97.2	100.5
EGFR21.M18	21:33:14.25	11.1	-45.6	76.9	97.2	100.5
EGFR21.M19	21:33:14.33	15.2	-52.5	76.9	97.2	100.5
EGFR21.M20	21:33:14.42	19.9	-60.3	76.9	97.2	100.5

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y	Z	VEL	HEADING
		(m)			(m/s)	(deg)
EGFR22.M01	21:36:48.78	-29.2	18.0	150.3	101.1	100.4
EGFR22.M02	21:36:48.77	-29.6	18.7	150.3	101.1	100.4
EGFR22.M03	21:36:48.74	-31.4	21.7	150.3	101.1	100.4
EGFR22.M04	21:36:48.69	-34.2	26.5	150.2	101.1	100.4
EGFR22.M05	21:36:48.71	-32.7	24.0	150.2	101.1	100.4
EGFR22.M06	21:36:48.45	-46.4	46.9	149.9	101.1	100.4
EGFR22.M07	21:36:48.51	-43.2	41.6	150.0	101.1	100.4
EGFR22.M08	21:36:48.59	-39.5	35.3	150.1	101.1	100.4
EGFR22.M09	21:36:48.65	-35.9	29.3	150.2	101.1	100.4
EGFR22.M10	21:36:48.65	-17.8	29.7	161.5	96.5	105.5
EGFR22.M11	21:36:48.65	-17.8	29.7	161.5	96.5	105.5
EGFR22.M12	21:36:48.65	-17.9	29.9	161.5	96.5	105.5
EGFR22.M13	21:36:49.37	1.2	-33.1	151.1	101.1	100.4
EGFR22.M14	21:36:49.37	0.9	-32.5	151.1	101.1	100.4
EGFR22.M15	21:36:49.34	-0.7	-29.8	151.1	101.1	100.4
EGFR22.M16	21:36:50.01	34.2	-88.5	151.9	101.1	100.4
EGFR22.M17	21:36:50.01	34.4	-88.7	152.0	101.1	100.4
EGFR22.M18	21:36:49.51	8.5	-45.3	151.3	101.1	100.4
EGFR22.M19	21:36:49.58	12.1	-51.3	151.4	101.1	100.4
EGFR22.M20	21:36:49.66	16.2	-58.3	151.5	101.1	100.4

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y	Z	VEL	HEADING
			(m)		(m/s)	(deg)
EGFR23.M01	21:40:11.81	-31.4	18.4	139.9	97.3	100.9
EGFR23.M02	21:40:11.80	-31.7	19.1	139.9	97.3	100.9
EGFR23.M03	21:40:11.77	-33.4	21.9	139.9	97.3	100.9
EGFR23.M04	21:40:11.75	-34.3	23.5	139.9	97.3	100.9
EGFR23.M05	21:40:11.82	-30.9	17.7	139.9	97.3	100.9
EGFR23.M06	21:40:11.57	-43.4	39.0	139.8	97.3	100.9
EGFR23.M07	21:40:11.66	-39.0	31.6	139.9	97.3	100.9
EGFR23.M08	21:40:11.76	-34.1	23.1	139.9	97.3	100.9
EGFR23.M09	21:40:11.85	-29.4	15.1	139.9	97.3	100.9
EGFR23.M10	21:40:11.96	-24.1	6.0	140.0	97.3	100.9
EGFR23.M11	21:40:11.96	-24.1	5.9	140.0	97.3	100.9
EGFR23.M12	21:40:11.96	-24.2	6.2	140.0	97.3	100.9
EGFR23.M13	21:40:12.43	-1.3	-33.1	140.2	97.3	100.9
EGFR23.M14	21:40:12.42	-1.6	-32.6	140.2	97.3	100.9
EGFR23.M15	21:40:12.39	-3.1	-30.0	140.2	97.3	100.9
EGFR23.M16	21:40:13.05	29.2	-85.2	140.5	97.3	100.9
EGFR23.M17	21:40:13.05	29.3	-85.4	140.5	97.3	100.9
EGFR23.M18	21:40:12.72	13.2	-57.9	140.4	97.3	100.9
EGFR23.M19	21:40:12.82	17.9	-65.9	140.4	97.3	100.9
EGFR23.M20	21:40:12.93	23.2	-75.1	140.5	97.3	100.9

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y	Z	VEL	HEADING
		(m)			(m/s)	(deg)
EGFR24.M01	21:43:26.70	-18.7	23.5	146.6	101.8	99.6
EGFR24.M02	21:43:26.69	-19.1	24.1	146.6	101.8	99.6
EGFR24.M03	21:43:26.65	-20.9	26.9	146.5	101.8	99.6
EGFR24.M04	21:43:26.58	-25.0	33.6	146.4	101.8	99.6
EGFR24.M05	21:43:26.56	-25.8	35.0	146.4	101.8	99.6
EGFR24.M06	21:43:26.27	-41.3	60.1	146.0	101.8	99.6
EGFR24.M07	21:43:26.29	-40.1	58.2	146.1	101.8	99.6
EGFR24.M08	21:43:26.32	-38.4	55.5	146.1	101.8	99.6
EGFR24.M09	21:43:26.35	-36.8	52.8	146.1	101.8	99.6
EGFR24.M10	21:43:26.39	-34.8	49.5	146.2	101.8	99.6
EGFR24.M11	21:43:26.39	-34.9	49.5	146.2	101.8	99.6
EGFR24.M12	21:43:26.39	-34.9	49.8	146.2	101.8	99.6
EGFR24.M13	21:43:27.28	12.6	-27.5	147.3	101.8	99.6
EGFR24.M14	21:43:27.27	12.3	-26.9	147.3	101.8	99.6
EGFR24.M15	21:43:27.24	10.7	-24.3	147.2	101.8	99.6
EGFR24.M16	21:43:27.88	44.5	-79.3	148.0	101.8	99.6
EGFR24.M17	21:43:27.88	44.6	-79.5	148.0	101.8	99.6
EGFR24.M18	21:43:27.24	10.7	-24.4	147.2	101.8	99.6
EGFR24.M19	21:43:27.27	12.4	-27.2	147.3	101.8	99.6
EGFR24.M20	21:43:27.31	14.5	-30.4	147.3	101.8	99.6

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EXIT TIME	X	Y	Z	VEL	HEADING
			(m)		(m/s)	(deg)
EGFR25.M01	21:48:18.16	38.9	36.7	9.4	103.1	102.1
EGFR25.M02	21:48:18.17	38.9	36.5	9.4	103.1	102.1
EGFR25.M03	21:48:18.17	39.0	36.4	9.4	103.1	102.1
EGFR25.M04	21:48:18.31	46.2	23.5	9.4	103.1	102.1
EGFR25.M05	21:48:18.51	56.1	5.8	9.4	103.1	102.1
EGFR25.M06	21:48:18.33	46.9	22.3	9.4	103.1	102.1
EGFR25.M07	21:48:18.48	54.4	8.8	9.4	103.1	102.1
EGFR25.M08	21:48:18.64	62.5	-5.7	9.3	103.1	102.1
EGFR25.M09	21:48:15.16	-108.0	291.9	9.9	57.8	90.6
EGFR25.M10	21:48:14.46	-134.2	322.5	9.6	57.8	90.6
EGFR25.M11	21:48:14.45	-134.6	322.9	9.6	57.8	90.6
EGFR25.M12	21:48:14.44	-134.9	323.3	9.6	57.8	90.6
EGFR25.M13	21:48:18.78	69.6	-18.4	9.3	103.1	102.1
EGFR25.M14	21:48:18.78	69.7	-18.6	9.3	103.1	102.1
EGFR25.M15	21:48:18.78	69.7	-18.7	9.3	103.1	102.1
EGFR25.M16	21:48:18.62	61.4	-3.7	9.3	103.1	102.1
EGFR25.M17	21:48:18.62	61.5	-4.0	9.3	103.1	102.1
EGFR25.M18	21:48:19.55	108.2	-87.6	9.1	103.1	102.1
EGFR25.M19	21:48:19.70	115.5	-100.8	9.1	103.1	102.1
EGFR25.M20	21:48:19.86	123.8	-115.6	9.1	103.1	102.1

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y (m)	Z	VEL (m/s)	HEADING (deg)
EGFR26.M01	21:52:20.44	-30.2	49.4	10.4	93.3	99.7
EGFR26.M02	21:52:20.44	-30.2	49.4	10.4	93.3	99.7
EGFR26.M03	21:52:20.44	-30.2	49.5	10.4	93.3	99.7
EGFR26.M04	21:52:20.48	-27.9	45.6	10.4	93.3	99.7
EGFR26.M05	21:52:20.55	-24.7	40.5	10.5	93.3	99.7
EGFR26.M06	21:52:20.26	-38.9	63.6	10.4	93.3	99.7
EGFR26.M07	21:52:20.31	-36.5	59.7	10.4	93.3	99.7
EGFR26.M08	21:52:20.37	-33.9	55.4	10.4	93.3	99.7
EGFR26.M09	21:52:20.41	-31.5	51.6	10.4	93.3	99.7
EGFR26.M10	21:52:20.47	-28.9	47.3	10.4	93.3	99.7
EGFR26.M11	21:52:20.47	-28.9	47.2	10.4	93.3	99.7
EGFR26.M12	21:52:20.47	-28.8	47.2	10.4	93.3	99.7
EGFR26.M13	21:52:21.12	2.8	-4.5	10.5	93.3	99.7
EGFR26.M14	21:52:21.12	2.8	-4.5	10.5	93.3	99.7
EGFR26.M15	21:52:21.12	2.8	-4.4	10.5	93.3	99.7
EGFR26.M16	21:52:21.13	3.0	-4.8	10.5	93.3	99.7
EGFR26.M17	21:52:21.13	3.1	-5.0	10.5	93.3	99.7
EGFR26.M18	21:52:21.38	15.2	-24.7	10.6	93.3	99.7
EGFR26.M19	21:52:21.42	17.6	-28.6	10.6	93.3	99.7
EGFR26.M20	21:52:21.48	20.2	-32.9	10.6	93.3	99.7

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y	Z	VEL	HEADING
			(m)		(m/s)	(deg)
EGFR27.M01	21:55:42.94	-29.6	50.1	23.7	97.6	99.4
EGFR27.M02	21:55:42.94	-29.6	50.2	23.7	97.6	99.4
EGFR27.M03	21:55:42.93	-29.8	50.5	23.7	97.6	99.4
EGFR27.M04	21:55:42.96	-28.2	48.0	23.7	97.6	99.4
EGFR27.M05	21:55:43.00	-26.2	44.7	23.7	97.6	99.4
EGFR27.M06	21:55:42.71	-41.2	68.8	23.6	97.6	99.4
EGFR27.M07	21:55:42.74	-39.5	66.2	23.6	97.6	99.4
EGFR27.M08	21:55:42.78	-37.8	63.4	23.6	97.6	99.4
EGFR27.M09	21:55:42.81	-36.2	60.8	23.6	97.6	99.4
EGFR27.M10	21:55:42.84	-34.4	58.0	23.6	97.6	99.4
EGFR27.M11	21:55:42.84	-34.4	58.0	23.6	97.6	99.4
EGFR27.M12	21:55:42.84	-34.4	57.9	23.6	97.6	99.4
EGFR27.M13	21:55:43.59	3.7	-3.5	23.9	99.7	99.4
EGFR27.M14	21:55:43.59	3.7	-3.5	23.9	99.7	99.4
EGFR27.M15	21:55:43.58	3.5	-3.2	23.9	99.7	99.4
EGFR27.M16	21:55:43.67	8.6	-11.3	23.9	99.7	99.4
EGFR27.M17	21:55:43.68	8.7	-11.6	23.9	99.7	99.4
EGFR27.M18	21:55:43.73	11.7	-16.4	23.9	99.7	99.4
EGFR27.M19	21:55:43.77	13.3	-19.0	23.9	99.7	99.4
EGFR27.M20	21:55:43.80	15.1	-21.9	23.9	99.7	99.4

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	EMIT TIME	X	Y (m)	Z	VEL (m/s)	HEADING (deg)
EGFR28.M01	22:22:30.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M02	22:22:30.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M03	22:22:30.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M04	22:22:30.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M05	22:22:48.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M06	22:22:48.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M07	22:22:48.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M08	22:22:38.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M09	22:22:30.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M10	22:22:30.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M11	22:22:30.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M12	22:22:30.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M13	22:22:29.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M14	22:22:29.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M15	22:22:29.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M16	22:22:29.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M17	22:22:29.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M18	22:22:35.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M19	22:22:35.00	510.0	0.0	1.4	0.0	85.0
EGFR28.M20	22:22:35.00	510.0	0.0	1.4	0.0	85.0

APPENDIX B: WEATHER DATA

TRIANGLE AREA WEATHER STATION

Date	Run No.	Wind Speed m/sec Station 3m	6m	9m	12m	15m	Average Wind Dir. Degrees	Temp °C Station 3m	15m
11/1/78	1	3.8	4.0	4.1	4.1	4.7	314	7.4	9.4
	2	3.9	4.1	4.5	4.2	4.7	316	7.0	9.4
	3	3.9	4.4	4.3	4.4	4.7	315	6.8	9.5
	4	3.6	3.8	4.3	4.1	4.8	317	6.8	9.5
	5	3.7	4.4	4.2	4.4	4.5	314	6.8	9.4
11/2/78	6	4.0	4.0	3.9	3.8	4.0	284	16.5	16.6
	7	2.8	2.7	2.9	2.9	3.0	287	16.5	16.6
	8	2.8	3.0	3.2	3.1	3.3	313	16.6	16.9
	9	2.6	2.9	2.9	2.8	2.6	284	16.9	16.8
	10	2.2	2.4	2.6	2.4	2.6	256	16.8	16.9
	11	2.4	2.6	2.9	2.8	3.16	263	16.9	16.8
	12	4.3	4.4	4.5	4.3	4.3	260	16.7	16.7
	13	4.3	4.5	4.4	4.5	4.5	282	16.5	16.4
	14	4.3	4.4	4.4	4.6	4.4	282	16.4	16.3
	15	4.1	4.2	4.1	4.4	4.3	297	16.3	16.2
	16	3.9	4.0	4.2	4.3	4.5	299	16.2	16.1
	17	4.0	3.9	4.0	4.0	3.8	303	16.1	16.0
	18	3.0	3.6	3.8	4.0	4.2	292	16.0	16.0
	19	4.2	4.3	5.0	4.7	5.2	299	15.9	15.8
	20	2.9	3.2	3.7	3.9	3.8	299	15.7	15.7
	21	3.0	3.2	3.5	3.7	3.8	289	15.6	15.6
	22	2.8	2.9	3.3	3.3	3.3	304	15.5	15.5
	23	3.4	3.6	3.4	3.9	3.8	293	15.4	15.4
	24	3.8	4.0	4.0	3.8	4.2	305	15.4	15.3
	25	2.8	3.5	3.8	4.0	3.8	295	15.2	15.2
	26	2.4	2.4	2.6	2.8	3.2	289	15.0	15.0
	27	2.2	2.4	2.5	2.4	2.6	286	15.0	15.0

DAMAGE CONTROL

WEATHER STATION

Date	Run No.	Wind Direct. Deg.	Wind Speed M/S
11/1/78	1	320	3.4
	2	320	2.7
	3	320	3.6
	4	315	3.1
	5	320	2.7
11/2/79	6	230	1.8
	7	250	3.6
	8	280	2.7
	9	280	2.5
	10	250	2.7
	11	245	2.7
	12	240	1.8
	13	270	3.6
	14	270	3.4
	15	300	3.6
	16	280	3.6
	17	290	2.7
	18	280	3.1
	19	285	3.6
	20	290	2.7
	21	285	2.7
	22	290	2.9
	23	290	3.1
	24	290	2.7
	25	285	2.7
	26	280	2.7
	27	275	2.2
	28	270	2.5

1.2m WEATHER STATION, VAN 1

Date	Run No.	Wind Direct. Deg.	Wind Speed M/S	Relative Humidity %	Temp. C^o
11/1/78	1	330	1.9	70	7.8
	2	330	1.9	70	7.8
	3	345	1.9	70	7.8
	4	345	1.9	70	7.8
	5	355	1.9	70	7.8
11/2/78	6	270	2.2	38	17.4
	7	285	2.5	38	17.9
	8	315	2.4	38	17.4
	9	315	2.4	38	17.4
	10	270	2.5	38	16.8
	11	300	2.5	38	16.8
	12	285	2.9	38	16.8
	13	290	3.1	39	16.2
	14	300	3.1	39	16.2
	15	315	3.4	40	15.7
	16	315	3.4	40	15.7
	17	315	3.5	40	15.7
	18	315	3.6	40	15.7
	19	315	3.6	40	15.7
	20	310	2.2	40	15.1
	21	310	2.2	40	15.1
	22	315	2.2	40	15.1
	23	315	2.2	40	14.6
	24	315	2.2	40	14.3
	25	320	2.2	40	13.4
	26	300	1.9	40	13.4
	27	300	1.9	40	13.4
	28	295	1.4	42	11.2

1.2m WEATHER STATION, VAN 5

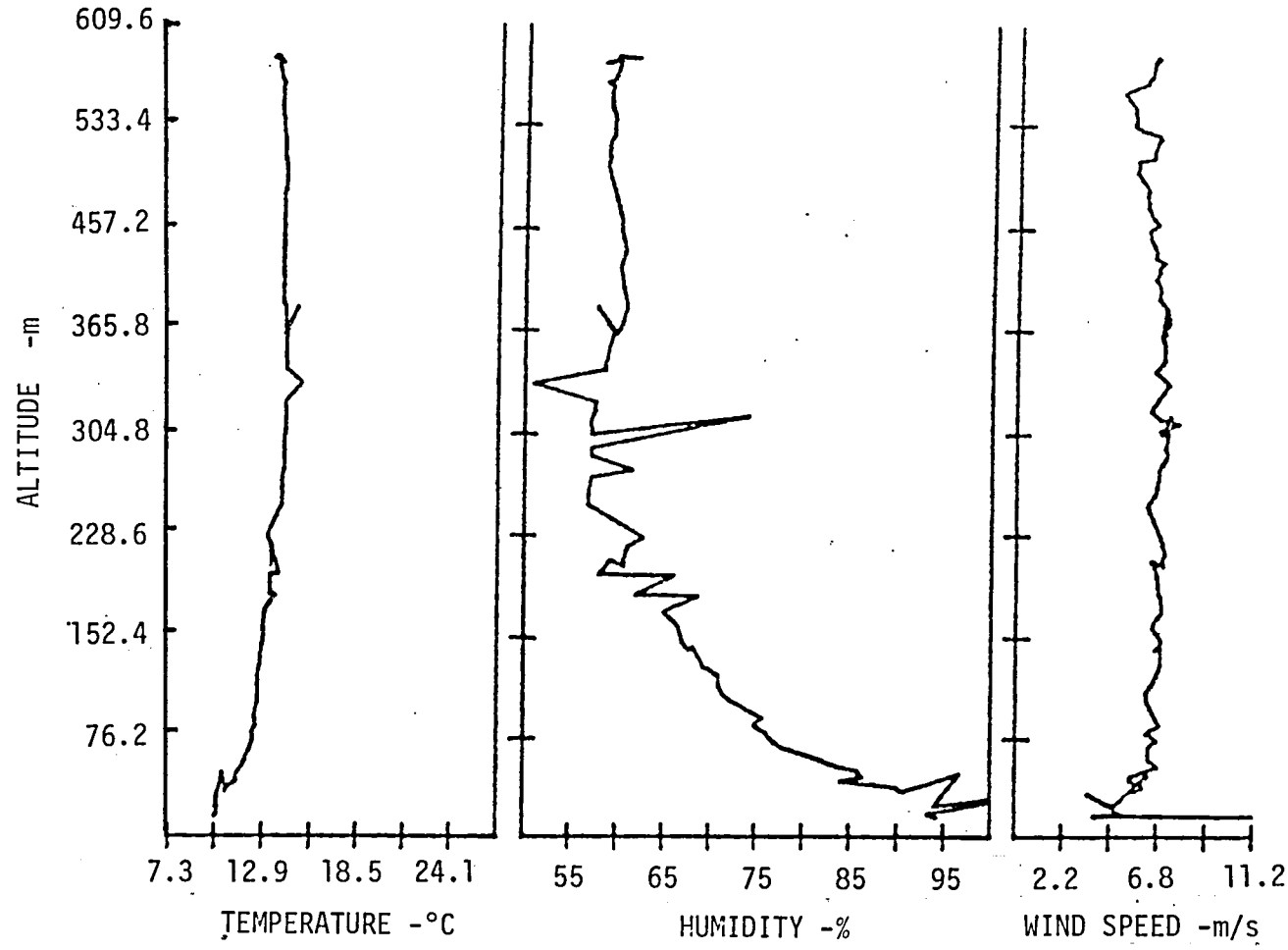
Date	Run No.	Wind Direct. Deg.	Wind Speed M/S	Relative Humidity %	Temp. C°
11/1/78	1	320	3.2	97	6.2
	2	325	3.2	96	6.7
	3	325	3.2	96	6.7
	4	330	2.7	96	6.7
	5	330	2.7	96	6.7
11/2/78	6	270	2.5	82	16.8
	7	290	2.5	82	16.2
	8	270	2.5	82	16.2
	9	240	2.5	82	15.7
	10	240	2.5	82	15.7
	11	250	2.5	82	15.7
	12	260	2.5	82	15.7
	13	270	2.7	82	14.6
	14	280	2.7	82	14.6
	15	285	2.5	82	14.0
	16	285	2.5	82	13.4
	17	285	2.3	82	13.4
	18	275	2.3	82	13.4
	19	275	2.3	82	13.4
	20	270	2.3	82	13.4
	21	300	1.4	82	13.4
	22	285	1.4	82	13.4
	23	255	1.4	82	12.9
	24	265	1.4	82	12.3
	25	270	1.4	82	11.8
	26	255	1.4	82	11.2
	27	255	1.4	82	11.2
	28	255	1.3	82	10.1

10m WEATHER STATION, VAN 3

Date	Run No.	Wind Direct. Deg.	Wind Speed M/S	Barametric Pressure mm Hg	Temp. C^o	Relative Humidity %
11/1/79	1	19.0	3.2	762.25	8.3	100.0
	2	25.0	2.7	762.25	8.3	99.0
	3	23.0	3.6	762.25	8.9	98.0
	4	31.0	3.6	762.25	9.4	95.0
	5	22.0	2.7	762.25	9.4	95.0
11/2/79	6	330.0	3.2	762.25	17.8	35.0
	7	344.0	1.4	764.29	17.8	35.0
	8	354.0	2.2	764.29	17.2	35.0
	9	4.0	1.4	764.29	17.2	35.0
	10	333.0	3.2	764.29	17.2	34.0
	11	359.0	1.8	764.29	17.2	34.0
	12	340.0	2.2	762.25	17.2	34.0
	13	342.0	2.7	763.52	16.7	36.0
	14	335.0	2.7	763.78	16.7	36.0
	15	360.0	2.7	763.78	16.1	37.0
	16	358.0	2.7	763.78	16.1	37.0
	17	356.0	2.2	763.78	16.1	38.0
	18	2.0	2.7	763.78	16.1	38.0
	19	6.0	2.7	763.52	15.6	39.0
	20	6.0	2.7	763.52	15.6	39.0
	21	2.0	2.2	763.78	15.6	39.0
	22	6.0	2.7	763.78	15.6	39.0
	23	2.0	2.2	763.52	15.6	39.0
	24	6.0	1.8	763.78	15.6	39.0
	25	6.0	2.2	763.52	15.0	39.0
	26	4.0	1.8	763.52	15.0	39.0
	27	359.0	1.4	763.52	14.4	39.0
	28	349.0	1.4	763.27	13.3	42.0

N159 WEATHER STATION

Date	Run No.	Barametric Pressure mm Hg	Wind Speed M/S	Wind Direct. Deg.	Temp. C^o	Dewpoint C^o
11/1/78	1	764.5	2.2	325	9.0	6.0
	2	765.6	2.2	325	9.0	6.1
	3	766.6	2.2	325	9.0	6.2
	4	766.6	2.2	325	9.5	6.2
	5	766.8	2.2	325	9.5	6.2
11/2/78	6	764.8	1.8	340	18.5	-15.5
	7	764.5	2.2	330	18.5	-15.4
	8	764.5	1.8	340	18.5	-15.2
	9	764.5	2.7	345	18.5	-15.1
	10	764.5	1.8	340	18.2	-15.1
	11	764.5	4.0	15	18.2	-15.1
	12	764.5	2.2	0	18.2	-15.1
	13	764.5	2.2	350	17.6	-15.0
	14	764.5	2.2	340	17.6	-15.1
	15	764.5	2.2	345	17.4	-15.1
	16	764.5	2.2	335	17.4	-15.1
	17	764.5	1.8	330	16.8	-15.1
	18	764.5	2.2	340	16.8	-15.1
	19	764.5	2.7	340	16.5	-15.1
	20	764.5	3.6	320	16.5	-15.2
	21	764.5	2.7	340	16.2	-15.2
	22	764.5	1.4	5	16.2	-15.2
	23	764.5	1.8	340	16.0	-15.3
	24	764.5	1.8	335	16.0	-15.4
	25	764.5	.9	350	15.7	-15.5
	26	764.5	.9	5	15.7	-15.5
	27	764.5	1.4	350	15.4	-15.6
	28	764.5	1.8	345	15.4	-15.6
	29	764.5	1.4	350	14.3	-16.0



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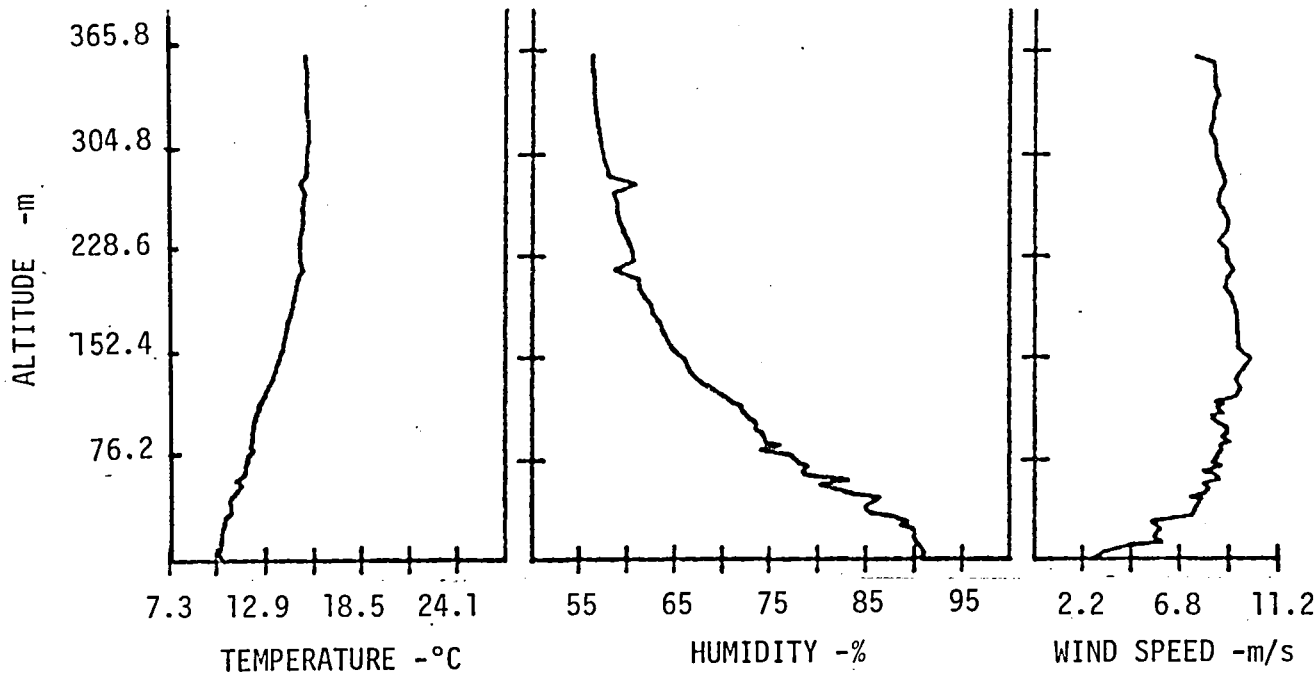

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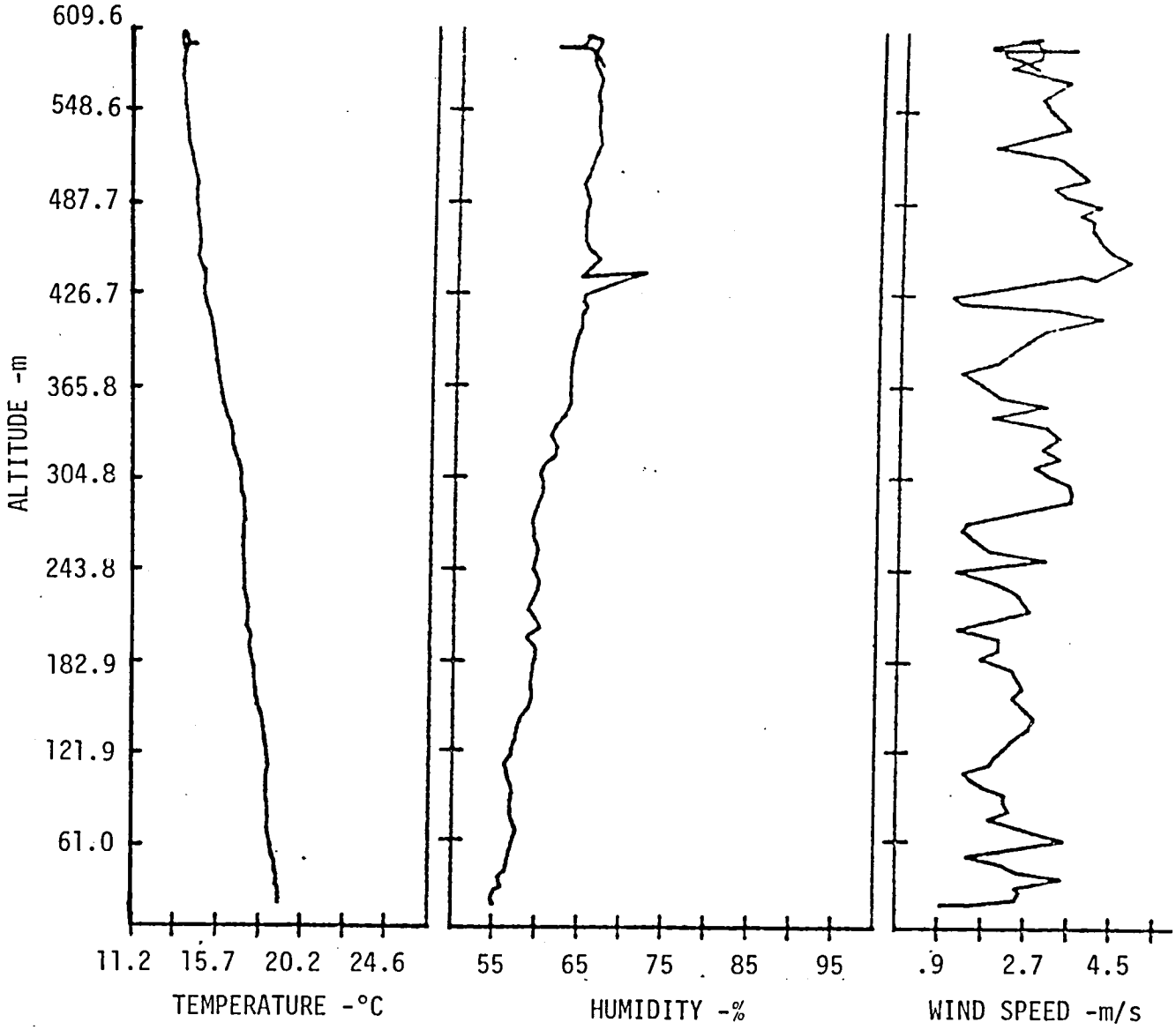

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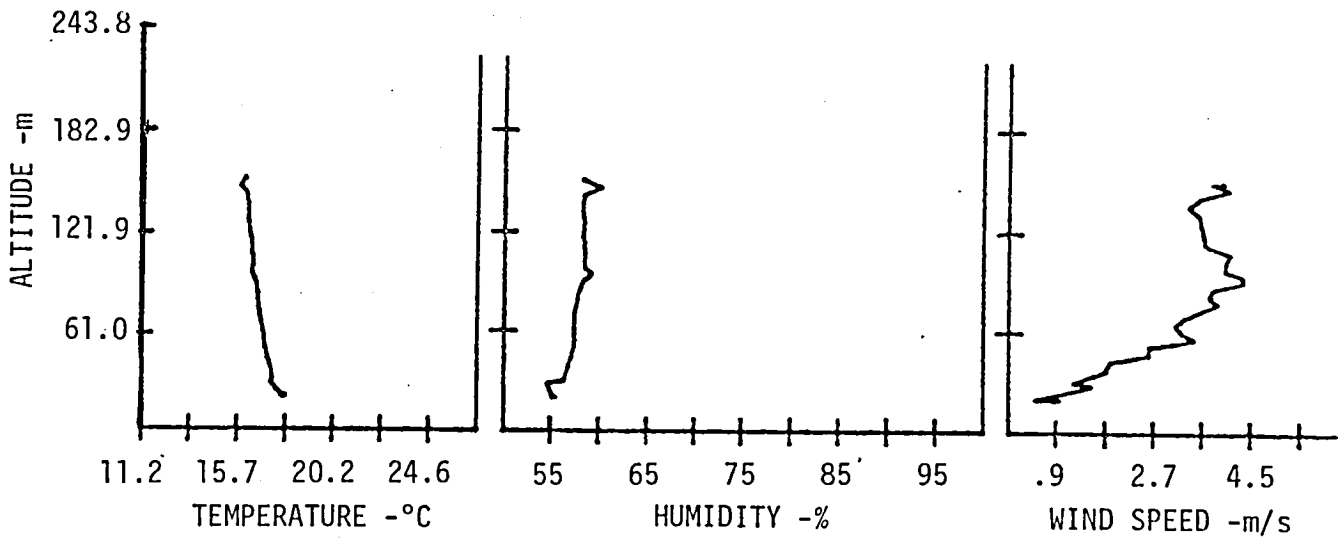

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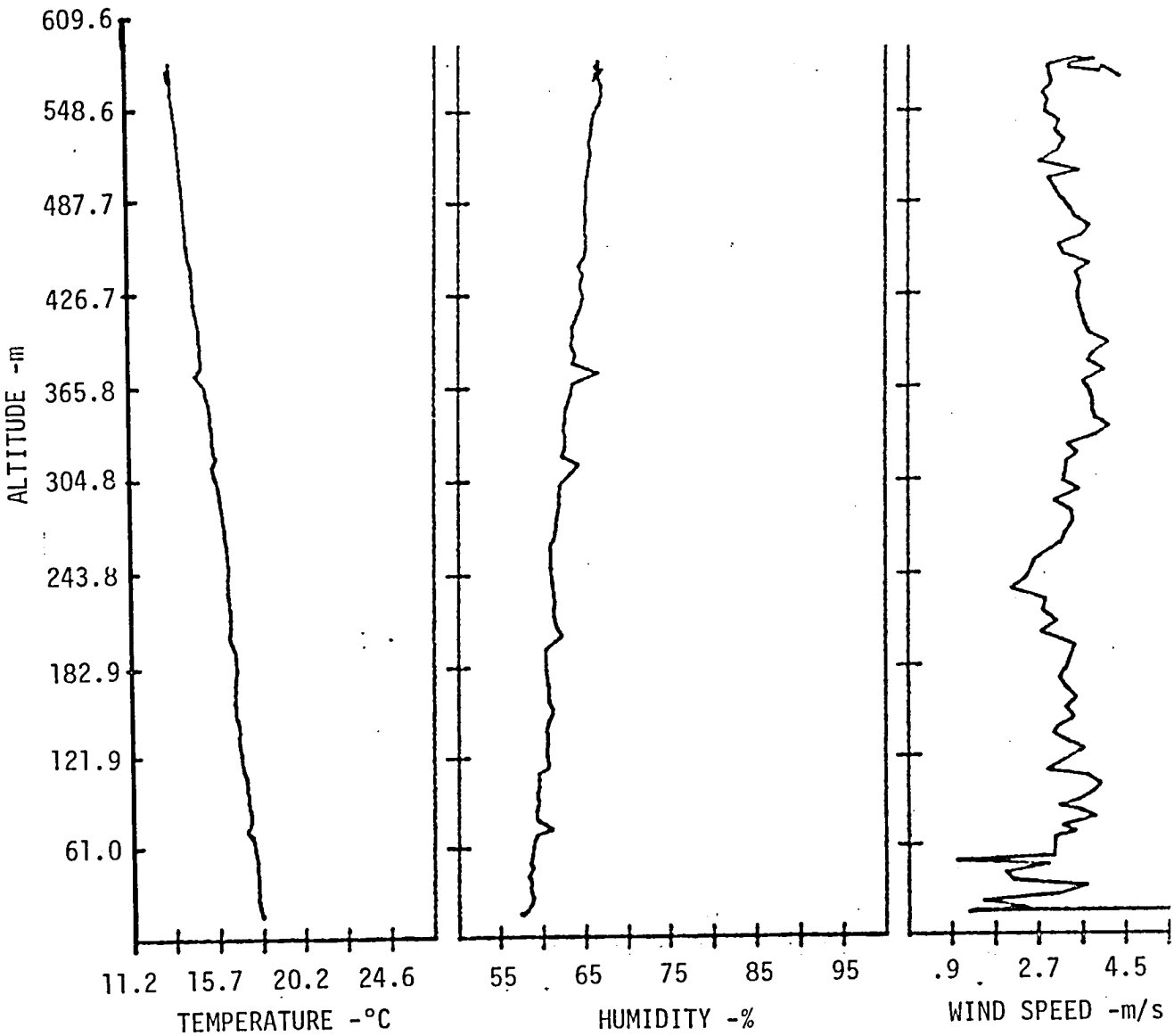

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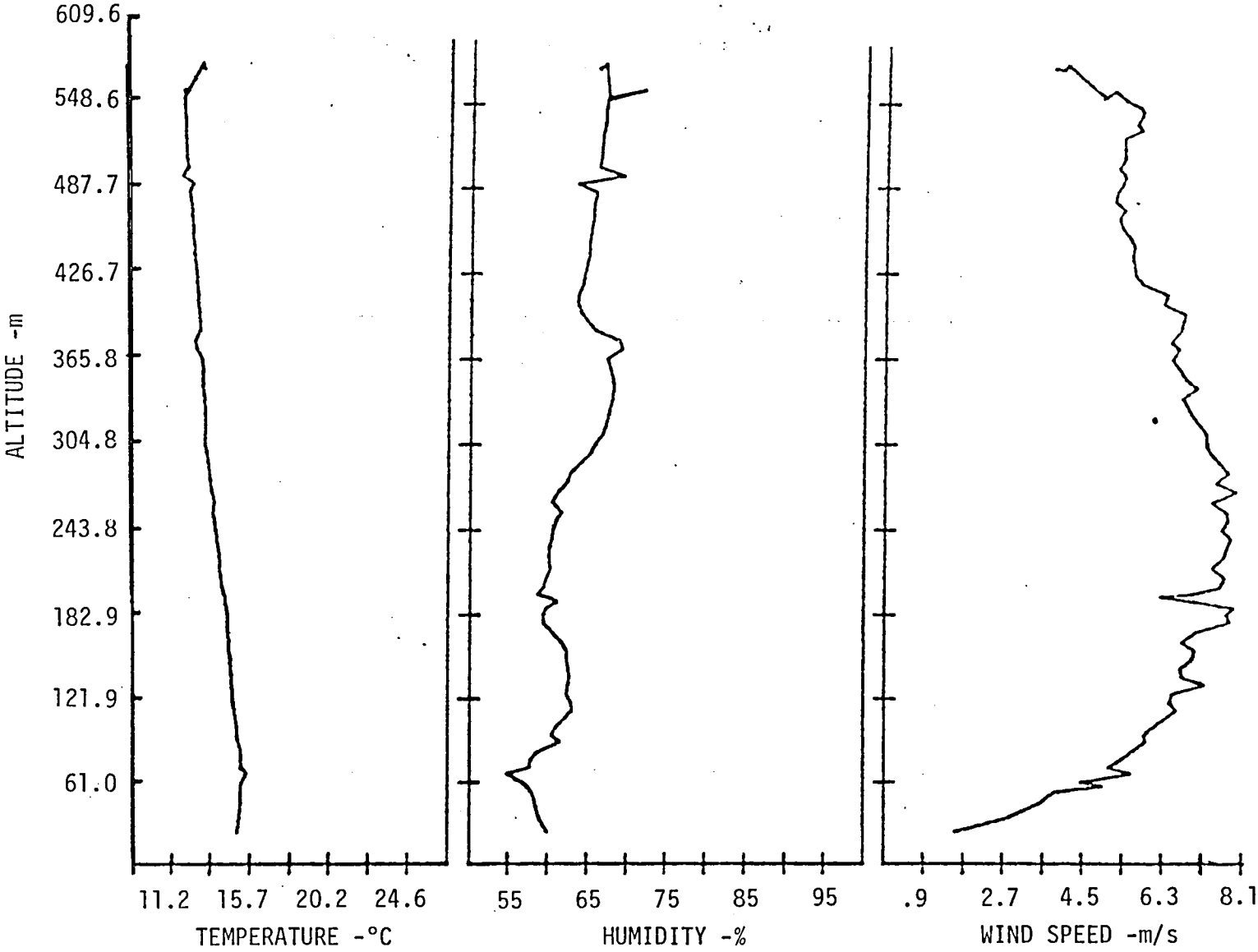

DATE 11/2/78 DESCENT #2 GMT START 21:36
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APPENDIX C: ACOUSTIC DATA

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR01.M01	11:46:38.69	3.2	212.9	100.4	76.9	82.4	87.6	91.7	94.5	93.5	94.2	91.8	85.2	79.9	78.0	76.5	76.8	74.6
EGFR01.M02	11:46:38.70	2.8	215.9	99.5	74.2	82.4	85.4	88.4	90.7	89.6	90.0	89.3	88.7	87.7	87.4	88.8	86.5	84.5
EGFR01.M03	11:46:38.71	0.7	218.6	102.4	75.0	84.2	88.8	94.0	95.2	88.6	88.4	95.1	88.7	91.3	90.7	90.1	88.7	85.4
EGFR01.M04	11:46:39.38	1.4	434.0	89.2	70.6	68.4	68.5	68.3	68.8	69.9	76.4	79.9	80.5	81.8	81.4	80.2	74.9	75.1
EGFR01.M05	11:46:40.30	0.8	729.1	85.5	76.2	73.2	71.3	64.6	66.6	66.7	74.1	74.5	77.0	74.8	72.6	68.9	67.6	64.7
EGFR01.M06	11:46:40.46	0.7	885.1	86.0	65.7	64.4	64.4	68.5	68.2	70.0	71.6	74.8	75.9	78.9	79.2	75.3	71.5	70.6
EGFR01.M07	11:46:41.16	0.6	1110.7	88.0	73.2	80.0	80.6	78.1	69.7	65.8	74.6	78.5	77.9	78.5	71.4	72.7	70.6	68.9
EGFR01.M08	11:46:41.92	0.5	1352.3	82.3	65.4	68.1	68.4	66.0	62.1	69.2	70.2	74.9	76.0	72.9	70.6	66.3	64.5	63.3
EGFR01.M09	11:46:42.61	0.4	1572.2	84.6	64.3	64.9	70.3	66.1	61.7	66.0	73.6	76.4	80.5	77.0	73.0	69.5	65.8	63.0
EGFR01.M10	11:46:43.38	0.4	1816.5	79.3	68.6	62.2	67.6	63.5	65.6	73.2	72.0	69.1	67.1	64.5	60.8	57.1	55.6	53.0
EGFR01.M11	11:46:43.38	0.3	1819.6	77.3	65.6	56.5	62.0	59.4	58.0	63.5	67.1	68.8	70.3	70.4	65.3	60.2	58.2	56.0
EGFR01.M12	11:46:43.39	0.1	1822.6	84.0	65.2	60.4	64.6	67.9	70.5	74.6	75.6	76.2	74.1	75.0	73.3	71.8	67.6	62.1
EGFR01.M18	11:46:43.11	0.4	1401.6	86.3	68.0	62.0	72.4	74.0	82.0	77.5	74.1	68.5	68.7	71.2	68.8	69.2	66.6	65.4
EGFR01.M19	11:46:43.80	0.4	1621.5	82.3	66.6	67.7	72.3	71.4	75.2	72.1	66.6	66.3	66.8	71.1	68.5	66.8	64.5	61.8
EGFR01.M20	11:46:44.58	0.3	1868.9	81.8	63.4	60.7	70.6	71.4	76.1	74.8	68.1	68.3	67.4	67.5	66.1	64.9	60.3	56.3

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR02.M01	11:54:28.21	3.1	216.7	99.4	79.0	77.8	84.1	91.7	91.8	93.1	93.3	89.7	84.3	79.5	75.6	75.1	75.1	73.9
EGFR02.M02	11:54:28.21	2.8	219.7	98.3	79.4	81.4	80.5	82.1	89.9	89.1	90.7	89.3	88.7	87.7	84.6	84.1	85.9	84.6
EGFR02.M03	11:54:28.22	0.7	222.4	103.2	75.2	77.9	88.5	92.9	95.2	90.8	90.8	97.5	90.9	93.4	90.4	91.9	89.7	86.7
EGFR02.M04	11:54:28.90	1.4	437.8	93.3	80.8	77.4	71.8	73.4	70.3	73.6	80.4	81.8	81.0	82.2	85.2	79.9	78.2	79.0
EGFR02.M05	11:54:29.82	0.8	732.9	87.5	74.5	79.5	73.8	73.0	69.1	69.7	72.1	75.0	78.5	81.1	76.3	75.1	70.6	71.3
EGFR02.M06	11:54:29.97	0.7	888.9	85.1	70.7	67.3	64.4	65.8	70.2	69.8	70.6	73.1	79.4	77.0	75.2	70.7	70.4	69.6
EGFR02.M07	11:54:30.67	0.5	1114.5	89.0	78.6	79.5	79.5	72.5	65.9	66.4	74.4	77.2	77.6	80.1	79.6	75.7	75.0	70.9
EGFR02.M08	11:54:31.43	0.4	1356.1	84.0	65.6	65.1	66.6	64.4	66.7	68.8	73.2	76.6	81.1	76.4	71.9	69.5	67.4	66.0
EGFR02.M09	11:54:32.12	0.4	1575.9	82.9	64.1	68.0	67.7	64.3	63.4	66.9	70.6	73.0	70.9	69.4	68.7	68.1	64.5	62.0
EGFR02.M10	11:54:32.89	0.4	1820.3	76.5	60.4	66.2	62.0	66.6	68.1	66.3	65.6	59.9	61.1	62.5	59.4	60.6	59.5	54.4
EGFR02.M11	11:54:32.90	0.3	1823.4	75.8	60.3	58.6	60.8	59.7	62.8	59.9	63.2	64.4	66.9	68.9	63.0	62.3	60.7	56.6
EGFR02.M12	11:54:32.91	0.1	1826.4	87.3	65.3	65.8	66.0	70.3	73.2	69.1	75.1	66.5	67.9	66.8	66.8	63.5	61.8	59.1
EGFR02.M13	11:54:29.02	2.7	249.8	97.5	78.4	74.2	77.3	81.4	89.8	91.2	89.0	84.0	86.2	86.8	87.2	83.9	82.6	80.9
EGFR02.M14	11:54:29.03	2.4	252.8	100.2	82.4	89.1	91.0	92.3	93.4	92.0	91.3	87.4	84.4	80.1	74.8	80.6	79.9	79.0
EGFR02.M15	11:54:29.03	0.6	255.6	105.4	81.0	84.5	91.2	94.8	96.1	98.5	96.5	94.1	92.6	94.0	91.1	89.0	90.4	90.5
EGFR02.M16	11:54:28.33	54.8	13.1	100.6	90.3	91.2	91.4	89.7	89.5	90.5	87.7	86.9	87.5	82.0	83.3	83.8	84.4	81.8
EGFR02.M17	11:54:28.33	54.5	13.1	111.3	100.5	101.0	103.1	99.7	94.9	96.2	101.2	105.2	102.9	98.2	96.1	98.7	98.3	97.2
EGFR02.M18	11:54:32.64	0.4	1405.4	91.6	73.0	76.8	81.5	84.3	86.0	86.1	76.3	73.3	76.0	72.3	71.2	70.9	66.4	61.6
EGFR02.M19	11:54:33.33	0.4	1625.3	84.3	70.4	67.8	68.0	74.6	74.3	72.7	69.2	70.2	77.1	74.0	72.0	67.5	63.2	61.1
EGFR02.M20	11:54:34.10	0.3	1872.7	82.3	68.3	67.8	62.1	66.4	75.2	74.9	75.0	70.2	67.2	68.2	67.2	64.3	60.1	57.3

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR03,M01	11:58:55.15	3.2	214.2	100.6	78.6	77.2	85.2	91.0	94.0	94.4	92.9	89.4	83.8	78.2	75.9	71.2	74.7	74.9
EGFR03,M02	11:58:55.16	2.8	217.2	78.4	62.3	63.0	61.1	61.2	62.6	61.3	62.5	62.7	63.3	61.9	62.0	63.2	62.8	61.2
EGFR03,M03	11:58:55.16	0.7	219.9	103.9	78.1	83.1	88.9	94.1	96.1	87.0	93.8	95.7	88.8	93.2	92.9	91.2	91.4	88.6
EGFR03,M04	11:58:55.85	1.4	435.7	91.5	75.1	68.6	66.8	69.3	70.1	72.1	80.9	81.0	81.8	79.9	85.1	81.0	78.9	79.3
EGFR03,M05	11:58:56.79	0.8	731.4	81.6	62.9	67.6	70.6	70.2	71.2	67.5	69.8	70.6	68.6	69.8	71.9	70.3	71.2	64.8
EGFR03,M06	11:58:56.95	0.7	887.8	87.2	71.1	72.1	69.9	67.5	68.6	72.3	77.3	75.6	78.3	79.9	78.0	73.7	71.7	72.6
EGFR03,M07	11:58:57.66	0.6	1113.9	87.5	75.1	75.4	72.5	63.3	67.8	72.6	75.9	76.2	77.6	79.5	76.8	75.0	72.5	72.9
EGFR03,M08	11:58:58.43	0.5	1355.9	86.7	65.1	65.2	66.8	62.5	66.8	68.0	76.5	81.7	81.0	76.7	76.3	68.3	69.3	68.4
EGFR03,M09	11:58:59.13	0.4	1576.2	86.8	68.5	67.2	64.8	59.4	60.6	66.5	70.3	69.4	68.3	71.2	72.1	66.2	64.1	62.5
EGFR03,M10	11:58:59.91	0.4	1821.0	81.9	66.4	65.7	67.9	64.6	65.7	69.5	67.3	67.7	66.1	62.4	61.3	58.3	58.8	58.2
EGFR03,M11	11:58:59.91	0.3	1824.1	78.9	62.7	63.6	61.7	57.5	60.8	62.7	64.9	68.1	68.3	67.5	65.4	63.0	62.3	58.3
EGFR03,M12	11:58:59.93	0.1	1827.1	85.4	66.3	67.1	67.1	72.0	75.1	75.4	72.8	69.9	70.7	69.4	70.0	67.0	65.2	62.5
EGFR03,M13	11:58:55.95	2.8	247.2															
EGFR03,M14	11:58:55.96	2.4	250.2															
EGFR03,M15	11:58:55.97	0.6	253.0															
EGFR03,M16	11:58:55.28	57.5	12.7															
EGFR03,M17	11:58:55.28	57.4	12.7															
EGFR03,M18	11:58:59.63	0.4	1405.0	84.3	70.6	70.8	65.3	72.5	75.4	72.1	71.0	69.0	70.5	71.8	67.0	71.3	68.4	65.1
EGFR03,M19	11:59: 0.32	0.4	1625.5	83.4	69.0	70.7	71.3	72.4	76.0	70.7	66.5	69.1	68.0	68.4	70.8	72.3	68.7	64.0
EGFR03,M20	11:59: 1.11	0.3	1873.6	80.6	67.9	69.7	71.9	69.6	72.0	72.1	68.2	66.6	66.1	63.4	62.9	63.9	62.3	59.4

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR04.M01	12: 2:48.28	3.6	203.6	99.3	82.6	81.7	81.9	89.7	89.5	94.1	93.0	91.5	84.0	79.6	75.1	75.4	73.2	70.6
EGFR04.M02	12: 2:48.29	3.3	206.6	99.0	75.1	81.0	83.3	85.5	87.9	91.1	90.3	89.7	86.9	84.7	84.3	87.6	90.4	87.2
EGFR04.M03	12: 2:48.30	1.0	209.3	102.3	71.3	83.0	87.0	91.7	92.7	90.7	89.0	95.5	88.4	90.8	90.4	90.1	89.3	84.5
EGFR04.M04	12: 2:49.03	1.6	426.9	90.4	70.7	69.9	67.9	68.1	66.2	69.0	75.6	81.2	82.8	81.6	83.0	82.4	76.8	73.0
EGFR04.M05	12: 2:50.04	0.9	725.2	87.5	71.2	80.0	77.3	76.8	75.9	72.6	74.7	74.0	78.3	78.4	75.2	72.8	71.6	69.6
EGFR04.M06	12: 2:50.23	0.8	883.5	82.3	59.1	63.7	61.1	63.6	66.7	68.1	70.7	75.1	76.9	73.1	70.8	72.7	69.7	66.4
EGFR04.M07	12: 2:50.99	0.6	1111.6	89.0	75.4	81.3	76.4	74.4	72.8	75.9	79.6	78.9	78.1	80.4	73.2	73.1	70.0	68.5
EGFR04.M08	12: 2:51.82	0.5	1355.8	85.8	69.4	62.0	68.6	70.3	67.7	71.8	79.4	79.1	76.0	74.6	72.6	72.9	68.4	64.7
EGFR04.M09	12: 2:52.56	0.4	1578.0	84.2	67.7	66.1	69.2	64.6	64.4	71.0	73.0	78.3	79.9	76.0	71.0	69.2	68.2	65.4
EGFR04.M10	12: 2:53.39	0.4	1825.0	79.8	64.8	66.6	72.0	66.5	69.3	69.4	69.6	61.3	61.1	62.5	60.6	60.3	60.1	57.3
EGFR04.M11	12: 2:53.40	0.4	1828.0	77.9	62.2	62.7	65.7	59.1	63.1	67.4	69.2	66.6	67.3	68.5	68.4	61.9	62.0	56.5
EGFR04.M12	12: 2:53.41	0.1	1831.1	90.5	67.8	69.1	72.7	74.2	75.0	76.9	76.6	72.4	74.5	72.8	71.5	68.9	66.0	63.5
EGFR04.M13	12: 2:49.07	3.0	235.5	101.8	82.0	81.1	74.1	84.4	90.9	93.6	96.8	89.5	90.8	89.9	91.0	88.5	88.3	83.4
EGFR04.M14	12: 2:49.08	2.7	238.6	101.2	85.7	89.1	90.5	92.9	93.4	90.5	94.7	91.9	86.5	84.6	77.8	81.6	85.3	88.5
EGFR04.M15	12: 2:49.09	0.8	241.3	95.8	81.6	81.2	83.2	86.7	85.4	84.8	83.9	84.3	85.3	81.8	83.8	84.6	85.5	84.1
EGFR04.M16	12: 2:48.52	35.5	19.2	97.3	90.5	89.0	86.7	89.1	90.8	88.5	83.2	82.1	82.7	82.3	81.4	81.1	81.1	80.4
EGFR04.M17	12: 2:48.53	35.8	19.1	95.6	86.9	87.1	88.3	88.8	88.2	88.4	86.0	86.2	86.4	85.9	84.9	84.9	85.1	84.3
EGFR04.M18	12: 2:53.11	0.4	1408.3	84.8	71.5	70.6	74.9	70.2	76.0	76.4	72.9	69.3	72.2	74.2	73.7	72.4	67.1	66.4
EGFR04.M19	12: 2:53.87	0.4	1631.2	84.4	69.7	71.3	74.0	78.6	75.6	69.8	70.2	67.0	68.2	67.4	68.2	68.5	66.1	65.9
EGFR04.M20	12: 2:54.73	0.3	1882.1	82.1	67.2	71.8	65.5	72.9	76.0	71.6	68.2	68.4	67.3	66.4	65.5	66.8	60.6	59.3

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR05,M01	12: 6:59.82	3.2	223.3	100.1	79.5	80.8	84.7	85.8	91.9	96.1	94.2	89.7	84.3	79.1	75.0	74.3	75.6	73.1
EGFR05,M02	12: 6:59.83	2.9	223.2	99.5	80.0	80.8	83.7	83.4	90.8	91.9	93.4	91.2	89.9	85.9	84.6	83.8	83.8	82.3
EGFR05,M03	12: 6:59.84	0.8	225.9	103.3	74.2	85.8	90.8	90.5	95.8	91.8	93.2	97.3	90.7	93.6	91.0	92.6	89.5	84.6
EGFR05,M04	12: 7: 0.50	1.5	440.8	92.5	73.4	70.0	65.3	66.4	68.8	73.9	80.7	80.8	82.1	82.1	85.0	85.6	82.1	75.6
EGFR05,M05	12: 7: 1.40	0.9	735.1	83.0	70.2	70.3	70.3	70.3	70.0	69.8	70.0	73.1	72.4	74.5	75.4	71.7	69.7	68.9
EGFR05,M06	12: 7: 1.55	0.7	890.6	88.8	66.2	70.4	72.8	70.4	73.0	76.8	82.2	79.7	78.1	82.0	79.7	78.8	76.9	71.0
EGFR05,M07	12: 7: 2.24	0.6	1115.7	84.7	73.9	69.7	79.0	74.2	73.6	67.1	66.8	68.9	73.6	74.2	75.2	74.3	71.4	68.7
EGFR05,M08	12: 7: 2.98	0.5	1356.6	83.3	65.4	64.9	67.1	67.4	62.7	64.2	75.3	78.6	77.7	72.6	71.3	68.4	67.2	66.6
EGFR05,M09	12: 7: 3.66	0.4	1575.9	85.2	67.8	69.9	70.0	63.8	61.5	67.0	73.6	73.9	75.4	73.9	71.5	70.8	66.9	66.3
EGFR05,M10	12: 7: 4.41	0.4	1819.7	79.3	62.6	64.3	66.4	69.3	70.8	70.6	70.2	66.1	65.6	62.8	62.9	62.5	61.1	59.1
EGFR05,M11	12: 7: 4.41	0.4	1822.7	77.9	61.8	57.8	59.6	62.9	59.8	61.7	66.1	69.3	69.9	67.9	66.5	63.9	63.7	62.9
EGFR05,M12	12: 7: 4.43	0.1	1825.8	82.5	62.4	67.2	68.6	70.3	70.8	72.5	72.7	70.1	70.6	68.7	68.1	65.3	63.4	62.3
EGFR05,M13	12: 7: 0.61	2.8	253.6	97.4	77.5	75.5	84.2	84.5	86.8	89.9	91.1	89.3	88.1	87.1	86.7	87.7	82.8	80.4
EGFR05,M14	12: 7: 0.62	2.5	256.6	103.4	83.7	93.3	89.8	95.7	96.9	95.1	96.1	90.4	87.4	85.1	79.5	84.4	87.3	88.5
EGFR05,M15	12: 7: 0.62	0.7	259.3	106.5	85.0	88.1	95.2	97.6	93.7	97.0	98.4	98.2	94.6	94.4	93.2	94.2	90.3	89.3
EGFR05,M16	12: 6:59.91	47.0	15.4	107.4	100.5	98.6	100.0	97.6	96.0	94.0	88.6	88.6	91.5	92.6	91.9	92.1	91.0	89.4
EGFR05,M17	12: 6:59.92	46.6	15.5	96.5	87.2	87.8	88.8	88.3	88.8	88.7	87.2	86.8	88.8	86.2	85.6	86.6	85.8	84.3
EGFR05,M18	12: 7: 4.15	0.5	1406.3	90.5	75.4	78.8	81.7	79.3	85.2	82.7	76.6	68.4	72.1	73.5	74.0	70.0	68.5	67.1
EGFR05,M19	12: 7: 4.82	0.4	1625.6	87.0	73.0	77.3	80.3	76.5	74.8	72.2	67.4	72.9	74.8	75.2	74.2	72.8	72.4	66.5
EGFR05,M20	12: 7: 5.59	0.3	1872.4	79.2	66.0	71.0	72.1	66.2	68.0	70.1	64.3	65.7	63.4	64.7	61.3	61.0	56.9	56.3

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR06,M01	19:37:38.44	3.4	219.6	93.6	80.5	80.3	83.2	80.2	84.9	86.3	87.3	82.3	77.6	74.8	68.3	67.8	66.5	64.9
EGFR06,M02	19:37:38.45	3.1	222.6	93.6	80.6	84.9	82.5	82.0	84.5	84.5	84.3	83.8	80.0	79.3	77.9	74.3	74.4	69.3
EGFR06,M03	19:37:38.45	1.0	225.2	103.1	78.6	76.5	82.1	87.3	94.1	96.4	98.0	94.6	87.5	90.7	85.6	87.0	86.8	85.1
EGFR06,M04	19:37:39.09	1.6	439.4	86.4	75.1	76.4	77.3	71.2	72.5	69.9	70.8	76.5	74.9	76.8	76.7	70.2	67.2	65.1
EGFR06,M05	19:37:39.98	0.9	732.9	72.3	61.3	61.5	61.9	55.7	52.7	51.6	55.2	53.5	56.8	56.2	54.2	54.9	54.2	50.3
EGFR06,M06	19:37:40.11	0.8	887.7	74.0	59.5	63.4	54.4	58.5	53.0	53.0	55.1	53.1	53.3	55.6	54.9	54.6	52.5	48.5
EGFR06,M07	19:37:40.78	0.6	1112.1	68.5	60.1	61.8	55.4	50.1	52.3	50.8	51.0	52.6	56.4	54.8	53.4	52.0	51.1	47.2
EGFR06,M08	19:37:41.51	0.5	1352.3	66.4	59.8	53.2	58.0	51.9	53.7	53.0	51.5	52.4	52.1	55.6	54.2	54.5	50.3	49.6
EGFR06,M09	19:37:42.17	0.4	1571.0	65.8	55.0	54.9	55.5	52.4	51.2	49.5	50.5	51.6	52.4	51.8	51.7	50.9	49.3	48.4
EGFR06,M10	19:37:42.84	0.5	1835.6	63.9	49.4	50.3	55.5	49.6	52.3	48.6	49.1	48.5	47.2	45.8	45.4	45.6	43.2	42.5
EGFR06,M11	19:37:42.86	0.5	1838.6	61.2	47.3	47.7	54.5	49.9	48.2	45.5	46.0	49.6	52.2	50.3	49.3	47.4	44.5	42.5
EGFR06,M12	19:37:42.87	0.2	1841.6	68.1	47.1	49.3	58.6	52.2	52.0	57.6	56.7	55.5	51.8	52.9	50.8	51.2	45.8	43.2
EGFR06,M13	19:37:39.23	3.0	253.2	98.9	80.0	83.9	87.7	87.9	82.4	78.4	85.3	92.7	92.6	88.3	87.5	87.1	85.2	78.3
EGFR06,M14	19:37:39.23	2.7	256.2	99.1	76.6	82.1	80.6	80.3	77.9	76.5	78.3	73.6	71.3	67.3	67.9	69.2	67.9	65.3
EGFR06,M15	19:37:39.24	0.9	258.9	96.7	80.2	80.8	83.6	88.4	86.7	87.7	87.3	86.4	85.3	84.4	82.6	78.6	76.4	72.4
EGFR06,M16	19:37:38.55	47.4	16.3	123.1	102.3	102.9	99.8	102.8	110.1	114.2	112.8	113.7	113.1	115.3	111.6	111.1	108.7	105.6
EGFR06,M17	19:37:38.56	47.1	16.4	123.0	102.0	102.0	100.5	102.1	110.9	113.9	112.7	115.4	113.3	115.7	111.8	111.0	108.6	107.1
EGFR06,M18	19:37:42.69	0.5	1402.4	70.3	53.1	52.6	53.1	52.5	54.1	57.1	56.2	55.5	55.3	53.1	51.5	49.6	49.1	47.3
EGFR06,M19	19:37:43.35	0.4	1621.0	65.3	54.6	50.8	57.1	56.6	53.5	54.6	54.1	52.1	53.1	52.0	50.9	49.0	48.3	47.2
EGFR06,M20	19:37:44.09	0.4	1867.1	64.4	50.0	47.8	57.9	51.2	54.2	53.3	50.4	51.5	48.4	47.2	46.4	44.7	43.1	42.3

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR07.M01	19:42:48.59	1.8	215.1	93.5	82.2	85.4	88.5	84.1	82.7	79.6	79.2	75.5	71.1	65.6	62.1	60.7	60.3	59.4
EGFR07.M02	19:42:48.59	1.5	218.1	92.8	82.7	86.3	86.4	80.7	81.6	78.6	78.5	75.7	72.2	70.5	71.6	70.2	69.2	70.2
EGFR07.M03	19:42:48.60	-0.6	221.1	104.0	84.4	87.3	86.4	83.2	90.1	91.6	95.3	95.3	96.0	92.9	93.1	93.6	92.4	89.9
EGFR07.M04	19:42:49.27	0.7	435.9	83.8	74.9	79.2	77.7	69.3	64.1	59.1	59.3	57.1	62.7	61.4	59.7	60.8	58.9	57.6
EGFR07.M05	19:42:50.17	0.4	730.4	72.7	63.1	67.7	61.6	54.1	51.4	52.3	53.7	57.0	58.8	59.1	59.1	56.7	54.9	51.4
EGFR07.M06	19:42:50.32	0.4	886.0	71.6	64.7	65.0	60.2	52.5	53.4	53.7	54.6	54.8	56.7	58.4	56.0	56.5	54.6	51.5
EGFR07.M07	19:42:51.02	0.3	1111.2	70.9	60.3	63.9	55.9	53.0	54.3	52.5	54.1	53.2	57.5	55.7	54.6	54.0	51.7	47.5
EGFR07.M08	19:42:51.76	0.2	1352.2	67.7	58.2	50.5	48.3	48.7	46.1	47.9	50.7	55.4	56.9	57.6	58.5	56.5	52.2	49.9
EGFR07.M09	19:42:52.44	0.2	1571.6	68.8	58.2	52.3	53.8	49.6	49.5	52.1	53.5	55.1	54.2	55.8	54.2	52.0	50.8	45.9
EGFR07.M10	19:42:53.19	0.2	1815.5	76.8	55.6	53.2	53.4	51.8	49.3	56.1	55.4	52.4	50.1	48.7	48.0	46.4	43.9	40.0
EGFR07.M11	19:42:53.20	0.2	1818.6	67.6	51.1	47.6	44.7	48.9	46.4	50.0	51.3	52.4	56.1	56.5	54.6	52.9	49.8	45.4
EGFR07.M12	19:42:53.20	-0.1	1821.6	79.1	51.2	49.1	54.8	58.1	56.9	61.4	63.0	60.4	59.5	55.2	54.3	53.4	50.2	45.6
EGFR07.M13	19:42:49.36	1.6	248.4	100.9	79.1	86.8	89.4	87.5	90.1	92.8	94.1	94.4	89.1	84.4	87.0	89.2	85.8	80.7
EGFR07.M14	19:42:49.38	1.3	251.5	91.9	77.8	80.8	82.9	81.7	82.5	80.3	81.0	80.5	79.6	71.5	70.1	66.4	65.4	64.0
EGFR07.M15	19:42:49.38	-0.5	254.5	95.2	82.9	83.9	83.8	82.6	84.9	90.0	88.7	84.6	78.2	77.4	78.7	76.5	71.2	68.1
EGFR07.M16	19:43: 9.34	****	1930.2	89.0	80.2	81.0	81.0	82.1	80.4	81.8	81.4	80.6	81.0	81.1	80.0	81.4	80.6	79.5
EGFR07.M17	19:43: 9.34	****	1929.9	94.4	84.9	85.1	85.2	87.4	85.4	86.0	85.5	85.9	86.3	84.8	84.4	86.2	85.4	84.9
EGFR07.M18	19:42:52.91	0.2	1401.8	70.8	59.9	65.8	59.0	58.6	61.7	60.4	58.5	57.9	56.5	55.9	52.7	53.1	50.6	45.4
EGFR07.M19	19:42:53.59	0.2	1621.2	69.4	58.3	56.2	50.8	53.3	58.3	59.7	57.1	55.5	53.3	53.1	51.6	50.6	47.4	46.2
EGFR07.M20	19:42:54.36	0.2	1868.1	73.5	58.4	60.0	55.4	48.3	54.0	56.5	60.8	58.8	58.4	55.8	54.6	52.5	50.1	45.2

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR08.M01	19:48:46.42	2.2	213.9	94.7	81.4	80.5	76.1	81.9	86.1	88.2	86.7	86.1	82.2	78.4	74.4	71.2	69.5	65.2
EGFR08.M02	19:48:46.44	1.9	216.9	96.6	82.0	80.5	75.2	80.8	84.4	84.0	85.8	87.1	86.1	85.8	86.2	86.3	86.0	85.0
EGFR08.M03	19:48:46.44	-0.2	219.8	100.3	82.0	81.4	75.5	85.9	89.6	95.1	95.1	92.5	83.0	86.7	84.3	84.1	83.0	78.8
EGFR08.M04	19:48:47.11	0.9	434.8	83.5	76.1	77.0	70.8	70.1	64.5	60.7	62.9	67.1	66.7	61.3	62.8	61.4	58.8	58.7
EGFR08.M05	19:48:48.02	0.6	729.6	80.6	52.7	58.9	58.5	55.6	47.0	50.4	53.3	57.0	59.8	59.6	59.5	54.6	55.1	51.8
EGFR08.M06	19:48:48.18	0.5	885.3	77.6	56.4	60.0	57.0	54.5	54.0	54.3	56.4	56.1	62.3	63.4	63.6	61.6	59.2	56.7
EGFR08.M07	19:48:48.88	0.4	1110.7	70.9	59.7	67.0	60.9	56.0	50.0	51.0	53.5	54.2	56.8	55.0	56.9	56.8	54.3	49.7
EGFR08.M08	19:48:49.63	0.3	1352.0	67.6	53.2	53.6	51.2	49.9	53.5	51.5	53.9	57.9	57.0	59.0	54.9	50.5	51.7	47.6
EGFR08.M09	19:48:50.30	0.3	1571.6	71.0	56.5	56.7	52.7	50.9	50.4	50.0	55.5	52.1	54.8	59.6	56.2	55.7	50.3	46.5
EGFR08.M10	19:48:51.06	0.3	1815.7	63.5	47.7	48.5	46.7	47.0	44.1	47.4	47.5	47.8	44.6	41.8	40.8	39.3	36.4	33.5
EGFR08.M11	19:48:51.07	0.2	1818.8	59.7	44.9	41.6	45.4	40.4	41.5	43.3	48.0	48.7	49.3	48.9	46.8	44.8	43.6	40.1
EGFR08.M12	19:48:51.08	-0.0	1821.8	73.5	55.6	53.8	51.3	55.3	60.0	65.7	67.0	62.2	62.0	61.7	56.5	53.8	49.4	46.5
EGFR08.M13	19:48:47.20	1.9	247.1	99.6	77.4	81.7	85.3	87.6	88.8	88.8	86.6	83.2	89.3	93.5	90.5	85.7	89.4	83.6
EGFR08.M14	19:48:47.20	1.6	250.1	92.8	79.6	77.6	78.6	77.1	77.4	78.6	80.1	82.2	82.5	77.9	76.8	74.9	74.1	72.0
EGFR08.M15	19:48:47.21	-0.2	253.1	94.1	85.6	84.1	85.2	84.3	84.6	87.3	84.3	83.5	78.3	77.5	72.7	72.5	71.0	67.6
EGFR08.M16	19:48:46.49	56.8	8.5	121.9	102.1	99.4	98.8	98.0	102.0	110.2	115.6	117.9	114.0	104.8	105.6	104.3	106.8	108.0
EGFR08.M17	19:48:46.49	56.5	8.6	121.8	103.2	101.1	99.7	98.1	105.2	110.7	115.4	118.1	112.0	105.9	105.6	104.4	106.4	107.2
EGFR08.M18	19:48:50.77	0.3	1401.5	72.8	60.0	63.1	57.1	59.3	62.1	66.1	63.2	58.5	56.2	57.8	53.7	49.3	47.0	43.8
EGFR08.M19	19:48:51.45	0.3	1621.1	66.9	54.1	55.8	52.8	55.4	55.2	59.5	56.1	54.8	53.5	52.2	50.8	48.0	44.7	40.9
EGFR08.M20	19:48:52.22	0.2	1868.2	67.9	51.5	57.3	52.0	50.7	53.0	54.0	53.4	51.3	52.3	51.1	47.1	45.6	42.1	39.4

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR09.M01	19:52:39.03	1.5	214.9	94.6	82.0	84.5	82.1	82.9	81.4	82.8	86.8	86.3	80.3	73.5	69.9	66.9	64.3	61.3
EGFR09.M02	19:52:39.04	1.2	217.9	94.6	83.2	82.1	84.0	82.0	81.2	80.8	84.4	85.5	83.0	78.8	79.9	79.6	78.2	74.8
EGFR09.M03	19:52:39.05	-0.9	220.9	101.0	83.9	82.4	82.5	80.6	88.0	91.9	94.9	96.1	90.7	85.4	82.9	86.8	87.7	83.1
EGFR09.M04	19:52:39.72	0.6	436.1	82.9	75.6	74.9	74.6	72.3	64.5	59.8	59.3	64.3	62.2	64.6	65.6	62.2	59.7	61.2
EGFR09.M05	19:52:40.64	0.4	731.3	74.1	64.6	60.6	54.4	51.3	49.1	49.6	58.4	55.5	56.4	61.5	57.8	57.0	54.4	50.3
EGFR09.M06	19:52:40.80	0.3	887.3	74.4	65.0	65.9	56.9	51.3	52.5	50.5	54.9	56.5	57.6	58.3	57.5	55.2	52.4	49.7
EGFR09.M07	19:52:41.51	0.2	1113.0	76.7	57.4	64.2	50.5	56.4	53.7	53.8	56.4	55.3	53.5	54.9	52.4	52.3	50.4	47.4
EGFR09.M08	19:52:42.26	0.2	1354.5	69.6	53.8	47.4	44.7	48.0	49.6	48.2	49.8	54.6	53.7	52.1	51.0	48.2	47.7	43.3
EGFR09.M09	19:52:42.95	0.2	1574.4	81.5	53.1	44.9	46.1	48.3	45.1	48.2	48.0	47.4	49.8	47.3	46.0	44.2	43.2	39.8
EGFR09.M10	19:52:43.71	0.2	1818.7	72.3	48.2	40.6	45.9	47.9	46.3	50.3	48.1	44.1	45.6	42.3	40.3	39.5	35.6	34.0
EGFR09.M11	19:52:43.72	0.1	1821.8	62.0	49.1	42.2	39.2	36.8	42.3	44.2	46.9	49.1	47.3	48.5	46.6	42.6	39.9	36.1
EGFR09.M12	19:52:43.73	-0.1	1824.8	75.1	47.6	49.6	44.7	48.3	51.5	50.3	54.1	52.6	53.4	48.3	47.3	45.9	43.6	41.2
EGFR09.M13	19:52:39.80	1.3	248.1	98.5	80.1	75.8	78.3	75.4	80.6	86.0	89.2	90.3	90.0	88.7	88.9	88.8	87.0	85.0
EGFR09.M14	19:52:39.81	1.0	251.1	92.0	79.0	82.1	83.2	81.1	78.6	80.8	77.0	79.4	74.7	75.3	70.2	70.7	68.8	66.9
EGFR09.M15	19:52:39.83	-0.8	254.1	93.3	81.7	84.9	83.7	82.9	81.9	83.7	83.4	80.9	79.7	80.2	76.4	74.0	72.9	71.9
EGFR09.M16	19:52:39.06	52.6	5.5	111.4	103.4	103.1	103.3	103.8	101.4	99.7	94.5	97.6	98.0	96.3	95.8	95.1	95.7	96.6
EGFR09.M17	19:52:39.06	51.7	5.6	112.0	105.0	103.9	103.5	104.8	102.1	97.8	94.8	98.8	97.0	95.7	96.6	96.1	96.2	96.9
EGFR09.M18	19:52:42.60	0.4	1386.1	69.5	56.5	54.1	50.4	53.5	55.0	54.3	52.9	55.7	54.6	54.5	51.1	49.2	47.6	43.2
EGFR09.M19	19:52:44.10	0.2	1623.7	64.9	52.1	45.7	45.2	48.4	50.4	49.5	50.8	51.0	50.0	48.5	45.8	43.9	41.1	38.8
EGFR09.M20	19:52:44.88	0.1	1871.1	64.5	50.1	46.5	48.2	52.4	53.6	56.1	52.9	53.0	48.3	49.6	46.5	46.8	40.8	39.9

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR10.M01	19:56:24.78	4.9	217.3	100.8	79.6	82.3	87.8	88.9	92.7	95.4	95.0	89.9	88.9	83.6	79.2	76.9	76.3	75.1
EGFR10.M02	19:56:24.79	4.5	220.2	99.6	81.5	80.9	85.9	87.6	91.5	90.4	90.8	90.2	89.2	89.2	87.8	87.8	86.3	84.0
EGFR10.M03	19:56:24.79	2.4	222.6	101.6	71.7	81.3	88.6	91.1	94.4	90.2	92.4	94.2	89.7	90.6	86.7	88.9	87.3	84.9
EGFR10.M04	19:56:25.45	2.3	437.4	83.2	74.5	72.9	74.5	71.0	71.0	68.6	66.4	68.4	71.0	69.1	66.7	65.0	63.7	62.0
EGFR10.M05	19:56:26.35	1.4	731.5	74.7	62.6	61.7	57.4	55.0	52.0	50.7	54.1	56.1	55.4	57.2	56.9	55.7	52.4	50.0
EGFR10.M06	19:56:26.50	1.1	886.9	72.3	62.4	65.9	52.4	49.8	51.7	51.0	49.4	55.7	56.1	58.0	52.3	53.6	52.9	48.3
EGFR10.M07	19:56:27.19	0.9	1111.9	72.5	62.3	64.0	55.8	50.3	52.5	50.5	50.8	52.0	55.0	53.3	53.6	52.8	50.3	46.7
EGFR10.M08	19:56:27.93	0.7	1352.7	67.3	54.7	54.6	53.4	46.5	47.9	47.8	52.0	52.6	53.9	54.2	54.1	52.3	50.2	46.5
EGFR10.M09	19:56:28.60	0.6	1571.9	64.7	54.7	49.9	51.1	49.5	48.0	46.9	48.7	49.5	47.8	50.7	47.8	45.5	43.4	39.9
EGFR10.M10	19:56:29.35	0.6	1815.6	64.3	42.3	42.8	46.2	48.7	47.8	48.7	47.1	44.5	43.6	40.6	39.1	36.3	35.5	33.0
EGFR10.M11	19:56:29.36	0.5	1818.6	59.8	48.6	40.6	43.9	41.7	45.1	43.6	47.0	46.9	46.9	49.1	48.2	45.9	41.6	37.5
EGFR10.M12	19:56:29.37	0.3	1821.6	72.0	51.2	49.0	52.0	50.3	57.3	52.8	59.2	60.6	55.5	53.3	56.5	52.6	48.5	44.6
EGFR10.M13	19:56:25.55	4.3	250.6	99.9	79.3	81.0	80.3	80.6	89.1	92.5	94.2	85.8	91.1	87.2	88.9	87.6	86.7	81.5
EGFR10.M14	19:56:25.56	3.9	253.5	102.0	81.5	86.8	91.9	94.7	91.2	90.2	93.5	93.0	91.4	88.7	86.2	84.6	82.0	73.9
EGFR10.M15	19:56:25.56	2.1	256.0	99.1	81.2	82.7	84.4	86.2	87.7	90.6	92.0	93.0	89.8	87.5	85.0	86.3	84.6	81.5
EGFR10.M16	19:56:24.94	55.8	21.0	113.0	99.7	101.5	101.2	102.9	93.0	90.5	97.6	107.5	105.7	101.9	95.5	96.0	97.9	97.3
EGFR10.M17	19:56:24.94	55.6	21.1	113.3	100.4	100.9	102.2	102.6	91.4	92.8	99.4	109.6	105.5	99.7	96.4	95.9	98.8	97.8
EGFR10.M18	19:56:29.09	0.7	1402.4	72.4	59.6	56.4	54.4	53.8	58.7	58.2	56.7	53.2	51.8	54.5	50.2	48.8	45.9	43.0
EGFR10.M19	19:56:29.75	0.6	1621.6	70.8	50.5	51.2	45.4	47.9	52.4	58.8	54.5	51.3	48.9	48.0	45.3	43.3	40.2	37.9
EGFR10.M20	19:56:30.51	0.5	1868.3	62.2	54.6	48.1	49.1	47.4	50.4	51.6	49.2	49.0	48.9	47.3	45.0	43.3	41.5	38.9

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR11.M01	20: 0: 2.70	5.8	211.0	99.3	79.4	80.7	85.6	89.7	90.9	93.9	93.2	89.3	84.5	80.7	77.0	74.9	73.1	70.6
EGFR11.M02	20: 0: 2.71	5.4	213.9	96.9	84.6	83.4	84.8	85.8	85.1	86.0	88.2	86.8	86.9	85.3	84.6	84.7	83.5	81.9
EGFR11.M03	20: 0: 2.72	3.2	216.1	98.8	71.7	79.8	81.8	85.9	91.6	88.1	91.1	91.0	88.3	87.4	86.2	85.1	85.0	82.5
EGFR11.M04	20: 0: 3.41	2.6	432.1	83.5	74.9	73.4	71.2	69.1	65.6	64.9	69.6	70.4	70.3	69.1	70.0	70.4	69.6	65.1
EGFR11.M05	20: 0: 4.35	1.6	726.0	75.1	62.4	64.1	54.9	54.6	51.4	50.5	55.2	54.3	58.0	54.6	54.0	53.2	51.7	52.0
EGFR11.M06	20: 0: 4.52	1.3	884.6	71.2	53.9	61.1	60.3	57.9	51.2	50.8	55.8	54.1	55.8	57.2	54.0	52.8	50.1	47.8
EGFR11.M07	20: 0: 5.25	1.0	1111.0	66.9	53.7	62.0	53.9	54.8	51.5	49.0	50.5	49.7	51.8	52.2	50.9	48.8	47.3	42.9
EGFR11.M08	20: 0: 6.02	0.8	1353.3	66.6	56.9	55.7	51.4	48.8	44.5	48.3	53.1	54.3	51.4	51.5	52.0	50.4	49.1	46.5
EGFR11.M09	20: 0: 6.72	0.7	1573.8	69.5	49.1	53.1	43.7	46.6	46.0	46.9	46.6	50.4	50.6	49.2	46.5	45.3	42.3	39.6
EGFR11.M10	20: 0: 7.50	0.7	1818.9	73.3	49.4	43.3	44.7	46.6	43.8	49.4	46.7	46.4	46.2	40.4	38.3	36.4	35.6	32.9
EGFR11.M11	20: 0: 7.51	0.6	1822.0	65.6	47.0	50.2	45.4	41.3	39.9	43.5	44.3	45.9	48.4	49.8	48.6	44.8	42.6	37.4
EGFR11.M12	20: 0: 7.52	0.4	1825.0	69.7	46.5	45.2	52.4	47.6	54.9	52.6	57.1	55.7	52.6	53.9	51.5	50.9	46.3	42.9
EGFR11.M13	20: 0: 3.48	5.0	243.7	81.0	57.6	57.9	57.3	58.1	57.3	59.3	58.9	56.8	56.6	56.2	56.2	56.8	56.4	54.9
EGFR11.M14	20: 0: 3.48	4.6	246.6	87.2	54.6	54.0	52.0	53.4	53.7	53.6	52.8	54.2	54.7	52.9	51.6	53.4	50.2	49.5
EGFR11.M15	20: 0: 3.49	2.8	248.9	67.8	61.1	57.5	56.3	56.8	57.4	57.3	58.4	58.7	58.4	57.1	56.3	57.3	56.3	54.8
EGFR11.M16	20: 0: 2.92	55.9	24.0	88.2	80.2	80.6	80.2	82.8	80.9	80.3	80.9	80.3	81.2	81.2	80.3	81.1	81.1	79.9
EGFR11.M17	20: 0: 2.92	56.0	24.0	90.1	80.4	80.3	81.7	84.8	80.9	82.7	81.3	81.0	81.8	80.7	80.1	80.8	80.7	79.8
EGFR11.M18	20: 0: 7.16	0.8	1402.2	70.6	54.7	59.2	55.1	56.5	60.3	55.4	54.8	54.7	53.7	52.1	49.8	47.8	44.2	42.2
EGFR11.M19	20: 0: 7.86	0.7	1622.7	69.0	47.5	52.8	48.9	52.4	53.1	54.5	56.3	54.1	53.2	49.6	48.8	46.4	43.3	39.5
EGFR11.M20	20: 0: 8.66	0.6	1870.9	64.5	53.2	53.3	48.5	53.4	50.2	52.5	54.1	52.7	51.2	49.2	47.9	44.6	42.4	39.5

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR12.M01	20: 3:59.73	5.9	215.7	97.7	79.1	83.0	81.5	84.9	89.6	91.1	91.6	90.0	85.4	77.4	74.4	71.7	69.0	63.5
EGFR12.M02	20: 3:59.73	5.5	218.5	97.5	78.5	77.0	79.2	80.7	87.5	87.0	87.6	90.5	86.6	84.7	85.3	85.7	83.9	81.3
EGFR12.M03	20: 3:59.74	3.4	220.7	95.2	80.9	83.6	80.5	82.7	83.8	87.3	88.2	87.8	82.6	77.4	80.4	79.6	75.4	77.8
EGFR12.M04	20: 4: 0.41	2.8	435.7	82.9	74.9	74.0	75.6	71.7	69.9	65.1	67.5	69.6	68.6	70.5	67.9	65.9	62.8	60.5
EGFR12.M05	20: 4: 1.31	1.7	730.1	73.7	62.2	61.3	58.2	58.0	52.0	50.7	50.7	58.4	59.3	58.0	57.2	57.3	54.1	50.3
EGFR12.M06	20: 4: 1.47	1.4	885.7	72.5	62.1	62.6	61.3	55.7	48.6	51.0	50.8	53.7	56.6	58.6	60.7	56.6	55.4	49.7
EGFR12.M07	20: 4: 2.16	1.1	1110.9	72.3	66.3	67.5	58.7	55.9	53.4	49.9	52.9	53.0	52.2	54.7	55.8	53.3	50.1	48.0
EGFR12.M08	20: 4: 2.91	0.9	1352.0	67.1	60.4	56.7	52.9	51.8	50.1	48.2	51.2	53.9	53.9	55.5	54.0	50.5	47.8	44.2
EGFR12.M09	20: 4: 3.59	0.8	1571.5	66.2	55.3	53.1	49.1	51.8	50.0	45.3	47.1	48.1	53.5	52.4	51.4	48.6	45.8	41.8
EGFR12.M10	20: 4: 4.34	0.7	1815.4	70.9	54.7	53.0	57.6	51.8	51.1	48.9	50.5	46.2	48.6	42.0	41.8	39.2	35.4	33.5
EGFR12.M11	20: 4: 4.35	0.7	1818.4	66.2	48.7	43.4	46.5	46.8	51.2	45.0	47.5	49.2	49.1	50.4	50.8	45.9	42.0	36.6
EGFR12.M12	20: 4: 4.36	0.4	1821.4	76.8	52.2	48.9	59.2	59.0	56.0	60.9	60.7	62.0	55.0	56.8	53.9	50.9	47.2	43.0
EGFR12.M13	20: 4: 0.49	5.2	248.8	97.8	76.2	76.6	85.7	88.3	87.1	90.9	86.5	88.3	88.4	84.7	87.4	85.9	86.7	83.7
EGFR12.M14	20: 4: 0.50	4.8	251.7	101.4	82.8	84.3	88.7	89.2	89.0	91.8	92.0	93.3	90.1	89.8	85.6	81.4	77.9	78.5
EGFR12.M15	20: 4: 0.50	3.0	254.0	105.3	80.7	82.5	89.5	86.4	93.4	96.1	95.7	95.0	96.2	93.9	93.8	95.3	94.6	90.2
EGFR12.M16	20: 3:59.91	57.4	25.1	124.6	89.9	100.1	106.9	111.0	115.4	110.8	114.6	114.4	116.3	114.5	113.1	111.6	110.6	109.2
EGFR12.M17	20: 3:59.91	57.3	25.2	124.7	91.5	100.3	106.5	110.9	116.1	111.9	114.3	115.3	115.5	114.6	113.0	111.6	111.3	109.1
EGFR12.M18	20: 4: 4.04	0.9	1401.5	69.7	58.7	59.2	57.0	59.7	58.6	54.2	56.9	53.3	55.2	52.7	51.0	47.0	43.0	40.6
EGFR12.M19	20: 4: 4.72	0.7	1621.0	68.3	55.7	48.5	55.3	54.5	55.7	55.2	57.2	56.5	51.4	52.3	48.4	48.1	44.4	40.4
EGFR12.M20	20: 4: 5.48	0.6	1868.0	66.3	49.9	52.3	53.6	53.2	55.1	59.4	56.6	52.6	52.2	49.6	49.4	46.5	42.9	40.5

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR13.M01	21: 2:30.64	5.5	204.9	97.0	84.7	81.4	83.7	87.3	88.0	89.6	90.8	88.3	84.2	81.6	78.0	73.2	72.7	71.0
EGFR13.M02	21: 2:30.65	5.1	207.8	101.1	82.3	84.1	83.0	85.5	88.3	88.0	88.8	90.9	89.4	90.4	91.1	89.3	90.0	89.5
EGFR13.M03	21: 2:30.66	2.9	210.1	103.3	75.9	78.1	87.6	90.5	92.8	94.5	91.3	95.7	93.2	92.7	90.8	90.9	89.5	87.0
EGFR13.M04	21: 2:31.38	2.5	428.0	87.6	75.4	77.2	72.6	68.5	66.8	63.1	69.7	72.9	74.0	72.4	73.0	71.8	75.4	76.1
EGFR13.M05	21: 2:32.37	1.5	726.3	75.6	62.3	65.1	57.7	58.4	62.3	50.7	63.0	65.4	68.9	68.1	66.2	61.5	64.7	63.4
EGFR13.M06	21: 2:32.60	1.2	884.7	81.1	66.7	59.4	57.8	62.5	64.3	51.2	64.9	69.6	72.3	72.9	73.6	71.7	65.9	62.7
EGFR13.M07	21: 2:33.36	0.9	1112.9	73.6	58.8	63.9	55.9	52.6	56.8	54.9	55.9	60.1	65.3	64.1	64.0	58.0	56.7	55.4
EGFR13.M08	21: 2:34.17	0.8	1357.3	72.2	55.6	52.8	54.2	52.6	55.8	56.5	58.6	61.6	61.7	62.2	62.9	62.7	60.8	55.3
EGFR13.M09	21: 2:34.91	0.7	1579.6	70.1	49.1	47.2	50.3	48.4	53.9	56.1	56.9	61.5	63.2	60.3	57.8	59.3	57.7	52.3
EGFR13.M10	21: 2:35.73	0.6	1826.8	68.0	51.5	46.6	46.6	49.7	49.8	45.6	45.7	48.5	49.2	43.6	43.2	41.8	39.9	38.8
EGFR13.M11	21: 2:35.73	0.6	1829.9	67.0	48.0	45.4	48.2	43.7	48.6	50.8	52.4	57.1	56.8	55.0	58.4	58.3	52.6	47.3
EGFR13.M12	21: 2:35.74	0.3	1832.9	73.5	45.3	47.6	48.0	53.4	54.6	55.9	56.0	53.7	57.3	55.8	53.1	49.1	46.1	41.6
EGFR13.M13	21: 2:31.35	4.8	236.9	97.9	76.7	78.6	83.5	85.6	89.5	91.5	85.8	87.0	88.5	87.3	89.4	88.0	86.0	79.4
EGFR13.M14	21: 2:31.36	4.4	239.8	99.8	82.3	83.8	88.4	90.8	92.9	90.7	90.0	90.3	89.3	88.8	85.4	84.6	79.8	75.1
EGFR13.M15	21: 2:31.37	2.5	242.3	100.9	80.7	84.6	89.7	92.4	93.6	92.3	91.2	89.1	89.9	90.1	88.9	85.9	84.1	80.8
EGFR13.M16	21: 2:30.84	46.3	25.6	107.1	94.6	98.2	95.1	97.9	91.7	89.7	89.0	94.1	100.0	100.6	92.9	88.1	91.0	89.1
EGFR13.M17	21: 2:30.84	46.6	25.5	105.0	97.8	96.9	96.5	96.9	94.8	91.1	84.9	88.1	94.2	95.7	92.3	88.2	86.3	88.6
EGFR13.M18	21: 2:35.23	0.8	1405.1	81.1	55.4	59.6	67.1	67.8	65.8	69.7	70.7	69.7	66.4	62.8	60.6	55.1	54.9	48.3
EGFR13.M19	21: 2:35.96	0.7	1627.4	76.2	53.4	50.6	57.9	63.4	64.9	65.4	64.6	63.3	57.8	55.7	56.2	51.5	49.6	43.3
EGFR13.M20	21: 2:36.80	0.6	1877.7	77.8	53.4	53.0	58.3	67.2	68.1	70.2	69.2	69.6	68.8	70.3	66.6	59.8	54.8	48.6

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR14.M01	21: 6:19.69	5.5	217.1	102.6	87.3	87.4	86.7	93.6	94.2	95.6	96.9	93.2	89.2	83.8	80.3	77.7	73.5	71.1
EGFR14.M02	21: 6:19.70	5.1	220.0	102.7	87.0	86.9	86.2	90.5	92.7	93.5	94.4	92.4	92.9	92.1	90.6	89.6	89.2	88.7
EGFR14.M03	21: 6:19.70	3.0	222.3	104.1	86.6	91.3	89.5	86.5	87.8	93.0	97.0	97.7	91.6	93.7	90.0	93.9	91.2	87.4
EGFR14.M04	21: 6:20.36	2.6	437.1	89.0	83.0	84.5	77.4	76.3	72.1	68.4	71.8	74.9	71.9	71.5	70.8	74.3	72.5	74.5
EGFR14.M05	21: 6:21.27	1.5	731.3	78.8	66.8	66.7	64.9	60.4	63.5	56.9	63.2	63.6	63.7	63.2	64.9	66.5	65.1	62.3
EGFR14.M06	21: 6:21.41	1.3	886.7	77.6	66.8	64.6	61.5	55.8	57.3	57.2	66.3	61.0	62.2	64.8	64.6	64.3	63.4	61.3
EGFR14.M07	21: 6:22.10	1.0	1111.7	76.9	65.3	59.4	61.6	55.1	56.7	59.6	55.3	60.3	65.3	63.1	64.2	63.7	60.0	55.4
EGFR14.M08	21: 6:22.84	0.8	1352.7	80.4	66.4	64.8	52.8	54.9	59.6	61.6	66.2	68.3	65.0	71.3	65.8	70.4	65.5	62.4
EGFR14.M09	21: 6:23.52	0.7	1572.0	75.0	58.6	58.0	55.5	49.2	51.2	56.7	59.8	61.7	62.1	59.9	59.0	59.4	58.0	56.6
EGFR14.M10	21: 6:24.27	0.7	1815.7	64.6	52.3	50.4	51.1	54.0	50.9	52.5	53.4	52.0	50.1	46.1	42.5	44.7	41.6	38.6
EGFR14.M11	21: 6:24.27	0.6	1818.7	67.1	50.7	48.3	50.2	49.7	52.2	53.1	51.7	58.5	59.1	58.0	56.4	54.8	52.8	49.8
EGFR14.M12	21: 6:24.28	0.4	1821.7	75.7	48.6	47.6	57.4	57.1	60.1	55.5	60.4	65.6	65.1	62.9	61.7	57.8	53.8	48.4
EGFR14.M13	21: 6:20.47	4.7	250.3	104.9	81.0	72.4	85.3	92.1	96.2	98.6	90.1	95.2	92.6	97.7	94.8	92.2	91.9	87.4
EGFR14.M14	21: 6:20.48	4.4	253.3	105.9	87.0	90.9	93.2	91.9	95.4	96.2	97.5	99.2	95.7	93.3	86.6	89.8	91.6	90.5
EGFR14.M15	21: 6:20.48	2.6	255.6	109.7	88.5	91.1	94.0	93.6	95.4	96.9	99.3	101.4	100.2	101.4	99.3	97.9	96.9	95.3
EGFR14.M16	21: 6:19.88	56.4	23.4	117.5	101.7	104.5	98.5	91.8	102.5	109.7	111.2	109.3	102.4	107.4	104.5	106.9	102.6	100.4
EGFR14.M17	21: 6:19.88	56.3	23.5	103.6	95.0	98.0	94.8	94.5	94.7	89.4	89.4	88.6	88.0	90.2	93.0	92.6	90.3	86.3
EGFR14.M18	21: 6:24.01	0.8	1402.3	78.1	62.3	61.6	65.5	63.3	65.5	70.8	69.4	64.5	65.0	60.7	59.0	59.4	57.7	55.4
EGFR14.M19	21: 6:24.68	0.7	1621.6	71.8	62.0	58.0	58.8	57.7	60.3	61.4	62.8	59.9	59.6	56.1	56.2	53.6	50.7	48.6
EGFR14.M20	21: 6:25.45	0.6	1868.4	71.9	60.1	61.0	57.8	59.5	57.0	62.7	60.9	57.8	57.9	55.9	54.3	52.1	51.3	45.8

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR15.M01	21: 9:53.99	5.2	205.3	100.6	81.1	82.2	88.2	91.3	91.7	93.8	93.8	92.0	87.4	80.9	77.4	76.7	73.4	71.7
EGFR15.M02	21: 9:54.00	4.8	208.3	102.2	83.5	83.9	85.7	88.2	90.9	89.0	94.0	92.7	90.2	90.1	92.0	90.6	90.0	88.5
EGFR15.M03	21: 9:54.01	2.6	210.6	104.7	73.8	85.3	90.8	95.4	96.2	92.1	91.5	97.0	95.4	93.1	90.6	93.6	94.3	88.9
EGFR15.M04	21: 9:54.71	2.3	427.2	88.5	75.2	76.7	77.0	67.5	66.1	64.9	69.9	74.9	76.1	74.9	79.2	81.7	79.5	72.1
EGFR15.M05	21: 9:55.66	1.4	723.7	78.9	67.3	65.6	67.1	60.6	56.8	55.1	61.9	66.1	71.4	68.3	65.8	67.5	66.4	64.0
EGFR15.M06	21: 9:55.85	1.1	880.9	77.1	68.3	63.8	63.8	65.2	58.3	59.0	60.6	60.8	66.6	68.0	65.2	64.7	66.3	62.6
EGFR15.M07	21: 9:56.59	0.9	1107.7	76.7	62.9	64.0	60.0	58.9	58.3	60.1	58.3	56.2	57.9	58.9	59.9	58.6	59.0	57.0
EGFR15.M08	21: 9:57.37	0.7	1350.6	78.6	65.9	57.9	53.9	52.6	57.5	56.9	61.5	61.5	62.6	66.4	66.3	66.2	63.7	59.4
EGFR15.M09	21: 9:58.09	0.6	1571.6	73.3	54.5	52.4	51.0	49.6	46.8	50.5	55.0	55.6	56.2	56.9	55.6	55.6	53.0	49.4
EGFR15.M10	21: 9:58.88	0.6	1817.3	66.5	53.0	51.8	48.7	52.4	51.7	55.4	55.7	54.3	52.1	53.1	49.8	47.5	46.4	43.6
EGFR15.M11	21: 9:58.89	0.5	1820.3	68.8	48.8	44.1	44.9	45.5	48.5	54.1	59.2	58.7	59.9	62.1	58.9	57.7	57.6	53.1
EGFR15.M12	21: 9:58.90	0.3	1823.3	71.1	43.3	48.0	54.9	54.2	58.3	54.6	54.7	59.7	59.2	55.6	55.8	52.3	50.2	46.3
EGFR15.M13	21: 9:54.77	4.5	238.1	103.8	83.6	80.8	78.9	81.1	88.6	97.5	97.9	93.1	90.0	94.3	90.4	93.0	93.2	88.7
EGFR15.M14	21: 9:54.77	4.2	241.1	106.6	87.1	87.5	88.0	95.7	97.8	98.9	97.5	97.3	97.2	96.4	95.1	93.5	93.3	89.7
EGFR15.M15	21: 9:54.78	2.3	243.6	108.1	86.2	88.0	88.8	96.2	98.4	99.7	98.4	97.5	98.0	96.5	97.3	96.6	97.0	95.2
EGFR15.M16	21: 9:54.23	48.5	23.5	112.9	98.1	99.8	98.8	97.7	94.9	92.3	102.9	104.4	107.5	101.9	98.6	100.2	96.2	95.7
EGFR15.M17	21: 9:54.23	48.8	23.4	106.4	94.9	103.1	93.4	91.8	91.8	88.4	88.9	88.0	87.5	87.3	85.8	86.7	87.0	85.5
EGFR15.M18	21: 9:58.56	0.7	1402.1	78.8	58.2	56.8	61.0	64.8	67.0	66.8	68.2	66.0	62.3	61.9	56.8	57.8	54.9	49.1
EGFR15.M19	21: 9:59.29	0.6	1623.6	65.8	54.5	56.5	53.5	52.3	54.6	54.9	55.8	53.7	53.5	51.6	50.5	48.8	47.0	43.3
EGFR15.M20	21:10: 0.10	0.5	1872.9	71.2	50.9	52.3	57.3	62.3	62.1	62.2	62.3	63.0	61.0	60.0	61.4	58.4	52.5	50.0

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR16,M01	21:13:55.13	10.6	205.0	98.3	86.3	89.5	88.7	90.3	89.0	90.6	87.2	85.5	82.1	83.1	83.1	81.3	81.4	79.5
EGFR16,M02	21:13:55.13	10.1	207.7	98.0	82.7	88.6	85.1	89.8	84.6	79.0	82.1	88.0	89.5	91.6	88.7	82.2	83.4	87.4
EGFR16,M03	21:13:55.13	7.8	209.0	102.9	80.4	84.8	88.0	89.6	90.2	93.4	94.2	93.4	93.5	92.7	93.0	89.7	88.0	85.1
EGFR16,M04	21:13:55.84	4.9	425.5	89.5	75.5	75.9	71.4	74.8	74.0	72.1	76.3	79.4	79.8	79.3	81.7	81.9	77.6	74.7
EGFR16,M05	21:13:56.81	2.9	722.3	81.0	63.2	65.5	63.5	62.1	61.6	63.6	64.1	70.2	68.2	67.5	72.8	72.2	73.4	70.8
EGFR16,M06	21:13:57.01	2.4	880.0	77.9	62.6	67.4	64.9	61.6	61.1	66.1	68.1	69.4	66.8	67.8	65.2	69.6	62.7	61.6
EGFR16,M07	21:13:57.76	1.9	1107.4	75.6	60.4	63.3	60.9	64.5	56.0	51.2	58.3	62.7	59.0	58.8	60.9	62.6	63.8	59.3
EGFR16,M08	21:13:58.55	1.5	1350.9	77.5	60.6	59.9	57.3	56.7	57.7	60.0	64.9	66.7	63.0	67.3	71.0	67.9	69.0	64.2
EGFR16,M09	21:13:59.29	1.3	1572.6	70.6	51.4	52.9	51.5	50.0	48.2	52.8	59.6	62.2	64.9	60.1	58.7	60.0	61.1	56.3
EGFR16,M10	21:14: 0.09	1.2	1819.0	64.9	55.1	49.3	50.0	51.6	51.5	57.6	55.1	53.3	51.5	47.6	44.4	42.8	41.7	39.7
EGFR16,M11	21:14: 0.10	1.1	1822.1	68.0	48.2	50.3	43.2	45.4	47.8	47.5	49.6	55.4	56.3	57.7	55.1	54.8	51.9	46.2
EGFR16,M12	21:14: 0.11	0.9	1825.0	70.5	45.7	45.5	48.1	56.0	59.1	53.7	61.2	63.5	57.7	51.2	52.1	50.0	51.8	46.7
EGFR16,M13	21:13:55.87	9.3	236.8	97.5	73.2	84.0	88.4	88.8	84.6	90.7	90.8	87.1	84.6	84.1	83.5	82.3	79.0	76.8
EGFR16,M14	21:13:55.88	8.9	239.6	98.4	83.0	87.3	89.4	89.0	89.2	90.0	91.2	89.3	84.8	77.0	79.9	84.1	85.1	82.7
EGFR16,M15	21:13:55.88	6.9	241.2	101.5	83.5	87.0	89.3	89.9	91.4	92.1	93.2	90.8	91.0	88.9	88.3	87.5	86.8	85.5
EGFR16,M16	21:13:55.54	53.1	46.6	100.1	93.6	90.3	90.7	89.0	88.1	83.4	81.8	84.9	91.6	87.1	84.8	83.9	86.1	83.2
EGFR16,M17	21:13:55.54	53.2	46.6	98.2	89.7	89.0	91.7	92.0	90.9	88.1	87.5	85.8	86.3	85.7	87.5	87.7	86.2	84.8
EGFR16,M18	21:13:59.66	1.5	1399.0	78.0	63.7	60.8	59.9	63.7	62.0	66.7	65.1	70.0	68.4	69.1	67.5	66.3	64.0	56.2
EGFR16,M19	21:14: 0.38	1.3	1620.8	68.4	59.4	57.1	57.1	54.3	58.7	60.5	59.3	58.8	55.7	54.7	51.6	49.5	47.0	42.7
EGFR16,M20	21:14: 2.14	1.2	1912.1	78.0	57.7	58.5	55.6	56.2	58.9	63.1	59.9	59.5	54.4	52.8	54.6	50.6	48.8	44.3

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR17,M01	21:17:36.15	10.6	214.1	99.4	86.2	88.2	90.1	91.6	94.6	91.5	90.1	86.4	84.0	80.8	81.3	79.0	79.1	80.3
EGFR17,M02	21:17:36.16	10.1	216.8	99.1	82.3	85.8	88.7	88.3	90.2	84.8	81.5	87.2	90.2	90.1	87.9	88.3	83.7	78.5
EGFR17,M03	21:17:36.15	7.9	218.1	100.5	82.4	85.9	91.2	87.6	86.5	92.6	90.8	92.5	91.5	91.4	88.7	86.5	84.6	82.2
EGFR17,M04	21:17:36.82	5.0	433.0	90.3	74.4	73.5	72.0	72.3	73.0	71.0	75.4	79.1	80.3	80.9	82.5	80.5	77.2	71.0
EGFR17,M05	21:17:37.74	3.0	727.6	81.7	62.8	64.7	63.7	56.7	53.3	56.8	62.3	64.3	68.0	68.5	66.7	66.0	61.2	54.9
EGFR17,M06	21:17:37.91	2.5	883.6	75.6	61.8	63.0	61.5	53.4	50.8	56.4	63.0	64.6	64.8	64.9	62.6	64.7	64.8	62.7
EGFR17,M07	21:17:38.62	2.0	1109.3	77.1	68.4	64.8	65.4	63.8	63.6	63.8	60.1	59.9	59.1	61.6	63.2	63.2	58.5	55.0
EGFR17,M08	21:17:39.38	1.6	1351.0	78.5	67.0	68.5	59.6	59.0	55.9	54.1	60.8	64.8	61.6	60.3	63.2	61.3	65.2	61.4
EGFR17,M09	21:17:40.07	1.4	1571.1	71.8	56.3	57.5	56.0	52.5	51.3	52.4	57.4	59.1	56.8	57.5	55.0	55.8	54.1	49.8
EGFR17,M10	21:17:40.84	1.2	1815.7	68.7	52.7	51.9	50.9	51.7	49.8	52.9	52.8	48.7	46.1	46.1	43.4	43.0	41.9	39.7
EGFR17,M11	21:17:40.85	1.2	1818.7	64.4	53.2	46.7	47.4	47.9	45.3	49.0	51.4	52.5	50.0	53.9	53.3	52.7	50.7	46.7
EGFR17,M12	21:17:40.86	0.9	1821.6	71.3	40.7	47.5	51.0	55.1	57.8	53.7	60.2	62.7	62.7	57.3	54.2	52.1	49.4	44.1
EGFR17,M13	21:17:36.90	9.1	246.5	101.2	78.7	88.6	87.8	83.7	87.8	94.7	93.1	92.4	92.3	92.1	90.7	88.5	85.2	80.9
EGFR17,M14	21:17:36.91	8.7	249.2	99.9	83.5	89.2	87.4	89.5	88.2	90.4	87.9	78.8	86.3	90.7	92.4	86.2	84.8	84.6
EGFR17,M15	21:17:36.90	6.9	250.7	104.4	82.8	90.1	89.0	92.2	91.1	98.4	97.9	96.1	95.1	94.4	92.3	91.6	90.7	88.1
EGFR17,M16	21:17:36.50	56.9	45.2	118.3	94.2	95.7	88.7	96.0	109.0	114.0	110.0	105.3	108.4	104.2	104.3	103.6	103.9	101.7
EGFR17,M17	21:17:36.50	56.9	45.1	100.5	91.1	96.6	92.1	92.6	92.6	85.5	82.2	83.4	87.7	88.4	83.3	83.0	86.1	82.5
EGFR17,M18	21:17:40.50	1.5	1400.2	79.0	62.3	64.8	62.6	71.0	72.6	71.1	69.1	63.9	62.4	58.1	57.0	59.4	56.9	53.5
EGFR17,M19	21:17:41.19	1.3	1620.2	75.8	60.0	63.0	62.4	64.6	61.4	62.6	67.6	68.4	67.9	61.9	58.5	58.3	55.5	51.0
EGFR17,M20	21:17:41.98	1.2	1867.9	70.5	49.1	50.1	54.9	56.7	62.1	62.7	63.8	63.9	56.6	53.4	49.5	50.2	45.6	43.0

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR18,M01	21:20:58.28	10.1	216.1	99.4	84.5	86.9	91.1	91.4	92.9	90.2	91.2	86.0	84.2	77.8	78.7	79.0	78.5	78.0
EGFR18,M02	21:20:58.29	9.6	218.9	100.5	86.0	87.7	87.7	88.8	91.7	88.6	84.7	84.9	91.1	90.6	90.4	88.2	86.7	81.7
EGFR18,M03	21:20:58.29	7.5	220.2	103.9	80.8	85.1	89.4	90.5	86.7	96.8	94.1	97.8	94.9	93.5	91.2	92.7	88.7	87.1
EGFR18,M04	21:20:58.96	4.8	435.3	94.3	74.7	74.6	74.3	73.7	74.3	72.3	79.3	83.8	84.3	86.4	86.9	86.3	80.7	72.4
EGFR18,M05	21:20:59.89	2.9	730.0	87.5	71.4	67.0	65.9	62.1	62.5	64.1	69.9	75.4	75.6	80.6	81.9	79.4	75.9	70.2
EGFR18,M06	21:21: 0.06	2.4	886.2	85.2	62.2	65.8	66.2	61.5	65.3	65.0	72.6	72.0	76.2	77.4	74.0	72.8	70.0	67.8
EGFR18,M07	21:21: 0.77	1.9	1112.0	76.7	62.1	64.4	62.5	63.0	64.0	62.6	61.9	63.4	65.1	65.3	65.6	66.7	60.5	57.8
EGFR18,M08	21:21: 1.53	1.6	1353.8	83.1	65.0	71.3	64.5	60.8	56.7	56.2	58.8	64.3	66.4	65.8	68.6	66.5	65.3	59.6
EGFR18,M09	21:21: 2.23	1.3	1573.9	75.3	54.6	58.2	56.6	52.6	54.0	54.9	57.2	60.3	61.2	60.0	61.2	57.3	54.5	50.8
EGFR18,M10	21:21: 2.99	1.2	1818.6	68.3	52.6	53.8	53.5	50.9	51.6	50.0	53.3	50.1	45.9	46.3	45.9	45.9	41.8	39.8
EGFR18,M11	21:21: 3.00	1.2	1821.6	66.9	50.5	50.7	49.6	44.8	43.0	46.4	49.6	54.6	53.8	53.0	51.7	52.6	49.9	45.2
EGFR18,M12	21:21: 3.01	0.9	1824.5	71.7	44.1	50.5	56.0	50.6	57.0	60.9	64.7	63.5	62.2	56.9	55.4	55.8	46.7	45.3
EGFR18,M13	21:20:59.02	8.7	248.5	101.0	78.6	82.6	89.1	91.6	85.6	94.6	90.9	91.3	90.4	91.8	88.3	87.5	85.1	82.4
EGFR18,M14	21:20:59.04	8.3	251.3	100.6	85.4	89.0	87.4	92.2	92.0	91.8	91.7	90.0	82.6	76.9	84.7	89.0	87.4	84.1
EGFR18,M15	21:20:59.03	6.4	252.8	100.4	80.6	79.8	84.8	89.1	88.3	91.3	90.7	90.9	91.1	91.4	89.9	89.7	87.6	89.1
EGFR18,M16	21:20:58.60	57.0	43.0	112.1	94.4	97.5	92.6	86.9	97.3	105.0	106.7	103.7	102.5	104.2	99.6	99.0	97.3	96.7
EGFR18,M17	21:20:58.60	57.1	43.0	107.6	88.9	98.3	93.0	88.4	83.8	90.9	100.6	102.6	100.0	91.6	92.0	90.6	95.2	91.7
EGFR18,M18	21:21: 2.65	1.5	1402.8	75.7	58.8	65.6	63.9	63.0	61.9	59.3	61.2	64.2	62.2	63.6	63.2	57.5	54.4	52.5
EGFR18,M19	21:21: 3.34	1.3	1623.0	70.6	56.3	60.7	54.1	57.0	61.3	63.4	64.3	60.1	57.4	57.5	53.6	52.8	49.0	46.1
EGFR18,M20	21:21: 4.12	1.1	1870.7	73.2	64.4	61.2	58.8	66.3	63.0	64.0	58.8	58.5	61.2	59.4	54.2	50.3	50.8	46.6

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR19,M01	21:25:58.45	18.7	219.8	100.6	88.2	85.5	89.5	88.9	88.6	89.4	91.4	90.6	91.7	91.3	89.3	88.9	88.3	86.4
EGFR19,M02	21:25:58.45	18.1	222.1	101.1	85.3	84.4	83.2	77.8	81.1	89.8	93.8	94.2	91.7	89.1	91.6	91.1	85.9	85.3
EGFR19,M03	21:25:58.43	16.0	221.8	103.4	86.3	82.2	91.1	87.5	93.6	94.8	95.5	94.9	93.2	95.1	91.6	90.7	88.3	84.4
EGFR19,M04	21:25:59.09	9.2	433.4	91.1	78.2	77.1	77.1	71.4	71.8	76.1	81.0	84.8	84.3	83.6	78.3	72.9	74.5	70.7
EGFR19,M05	21:26: 0.00	5.5	726.5	80.8	67.7	70.5	64.3	64.7	65.6	61.7	62.9	66.9	71.5	72.9	69.0	69.2	61.4	60.1
EGFR19,M06	21:26: 0.19	4.5	882.5	84.8	64.2	68.4	64.4	63.5	63.7	59.8	62.6	65.4	68.9	69.6	68.7	67.8	64.6	60.1
EGFR19,M07	21:26: 0.90	3.6	1108.2	80.0	66.7	68.2	71.2	70.6	72.5	66.3	67.6	68.6	69.7	71.1	64.2	65.4	67.1	60.1
EGFR19,M08	21:26: 1.67	2.9	1350.2	78.9	63.1	63.6	63.7	62.9	62.4	58.8	64.0	64.9	67.2	69.1	69.0	68.1	67.5	59.6
EGFR19,M09	21:26: 2.37	2.5	1570.5	73.6	58.4	54.0	55.0	53.4	57.5	56.3	61.4	62.7	61.2	62.7	59.9	59.7	57.0	51.9
EGFR19,M10	21:26: 3.15	2.2	1815.6	69.1	59.5	54.4	56.8	57.7	56.9	57.5	57.6	50.0	51.8	48.9	48.9	48.3	46.5	39.7
EGFR19,M11	21:26: 3.16	2.2	1818.6	66.9	59.1	53.0	55.0	48.8	51.6	51.4	53.4	53.4	58.0	56.7	55.3	52.9	51.0	44.6
EGFR19,M12	21:26: 3.16	1.9	1821.3	75.5	51.4	51.4	56.6	56.6	55.8	61.8	57.8	55.6	56.6	53.7	51.9	50.4	45.4	40.4
EGFR19,M13	21:25:59.16	16.4	250.6	102.1	77.4	84.3	90.3	88.2	93.2	92.2	92.1	93.8	92.8	92.9	92.0	92.5	89.2	85.6
EGFR19,M14	21:25:59.17	15.9	253.0	100.0	78.8	84.1	88.5	89.0	90.2	88.5	85.0	85.4	90.2	93.9	90.9	81.2	85.2	80.5
EGFR19,M15	21:25:59.16	14.0	253.1	96.7	72.3	80.0	79.4	78.8	85.2	86.1	88.2	90.1	89.6	87.6	85.5	84.8	83.3	79.2
EGFR19,M16	21:25:59.05	56.9	82.9	112.7	85.0	82.3	89.1	100.9	103.7	104.4	99.1	104.7	103.7	103.6	99.6	99.7	97.4	97.3
EGFR19,M17	21:25:59.05	57.0	82.9	107.6	96.0	91.2	81.8	86.9	94.1	100.5	101.2	94.0	100.3	96.9	92.8	88.9	90.4	92.1
EGFR19,M18	21:26: 2.77	2.8	1398.9	81.4	60.0	67.5	73.4	71.2	76.8	74.0	64.7	67.3	64.4	63.5	60.1	57.9	54.6	50.9
EGFR19,M19	21:26: 3.47	2.5	1619.3	81.1	61.8	64.4	69.8	68.4	71.8	69.6	65.2	64.1	62.9	61.3	60.7	57.5	55.7	51.2
EGFR19,M20	21:26: 4.26	2.1	1867.4	73.0	58.7	63.0	66.1	59.9	62.8	65.4	59.4	61.7	57.9	58.8	55.4	48.9	47.9	45.6

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR20,M01	21:29:40.24	21.9	228.6	100.6	85.6	86.9	90.1	88.4	90.2	87.0	88.5	90.6	92.1	90.0	86.2	86.1	85.2	86.5
EGFR20,M02	21:29:40.24	21.4	230.8	99.3	84.5	85.4	83.3	78.6	81.9	86.4	92.6	94.0	93.8	84.3	85.6	85.6	81.8	84.1
EGFR20,M03	21:29:40.22	19.4	229.7	102.4	83.0	79.0	89.4	88.4	92.6	90.9	93.1	96.0	93.2	91.9	90.6	91.1	87.3	85.7
EGFR20,M04	21:29:40.84	11.1	438.3	89.3	75.9	78.9	75.3	72.8	72.5	75.6	79.1	83.3	82.8	80.8	76.0	73.3	70.9	69.5
EGFR20,M05	21:29:41.73	6.6	729.5	82.1	67.6	66.1	66.8	63.5	65.8	69.8	69.5	70.5	74.4	70.8	67.5	67.6	65.4	59.8
EGFR20,M06	21:29:41.91	5.4	884.7	81.7	62.7	65.5	64.1	66.3	64.8	66.4	66.4	67.2	69.3	69.0	71.1	69.5	66.0	59.1
EGFR20,M07	21:29:42.61	4.3	1109.7	82.2	69.9	68.8	71.7	68.3	69.7	69.5	70.2	67.8	71.1	71.8	69.8	72.0	68.7	64.6
EGFR20,M08	21:29:43.37	3.6	1350.9	86.1	64.5	62.5	59.2	61.6	62.3	71.6	76.2	77.5	79.3	79.2	77.1	75.7	69.4	59.0
EGFR20,M09	21:29:44.05	3.1	1570.7	69.8	58.0	56.9	52.8	51.1	50.8	53.4	55.8	57.9	58.9	57.8	55.5	55.5	53.7	49.6
EGFR20,M10	21:29:44.83	2.7	1815.2	66.4	57.2	56.3	58.9	55.8	51.2	54.2	49.3	50.8	50.7	51.7	48.2	47.9	45.9	40.6
EGFR20,M11	21:29:44.84	2.7	1818.2	65.9	53.4	52.4	54.4	50.6	45.8	48.3	49.3	53.0	57.9	58.7	56.8	56.6	51.6	45.9
EGFR20,M12	21:29:44.84	2.4	1820.9	70.7	44.0	48.8	58.3	59.0	57.9	63.7	65.3	62.2	57.0	55.8	54.2	54.5	51.2	42.6
EGFR20,M13	21:29:40.95	19.4	258.9	102.3	81.4	80.9	91.3	88.9	92.9	92.2	93.1	93.2	93.3	92.0	91.3	90.0	86.6	83.1
EGFR20,M14	21:29:40.96	18.9	261.2	102.7	84.6	87.7	85.7	86.0	80.6	85.4	93.2	97.5	96.6	90.0	91.9	90.9	87.4	85.0
EGFR20,M15	21:29:40.94	17.1	260.7	95.8	75.6	79.5	80.4	83.4	83.9	85.2	86.8	87.1	86.6	87.8	85.6	83.9	82.1	80.7
EGFR20,M16	21:29:40.94	57.7	100.5	107.1	82.2	87.1	83.2	82.9	93.2	101.0	101.2	97.1	96.0	95.9	91.9	92.1	91.7	90.4
EGFR20,M17	21:29:40.94	57.7	100.4	107.0	84.5	87.2	82.8	83.1	93.0	101.5	102.1	96.6	96.4	97.1	93.6	91.0	91.6	90.1
EGFR20,M18	21:29:44.47	3.5	1399.9	85.9	67.5	70.7	71.1	75.7	76.2	77.0	77.5	75.2	75.0	68.9	65.1	62.1	59.7	56.9
EGFR20,M19	21:29:45.16	3.0	1619.8	80.0	66.2	67.7	68.9	72.0	74.3	74.7	68.5	66.5	64.7	60.1	59.2	58.8	55.7	49.3
EGFR20,M20	21:29:45.93	2.6	1867.3	78.7	64.7	67.2	68.2	70.0	73.1	72.3	65.9	62.9	65.9	62.6	54.4	52.9	50.0	47.7

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR21.M01	21:33:13.89	20.4	219.5	100.8	81.0	85.3	90.5	90.9	88.9	88.2	92.4	92.0	92.3	91.1	86.9	84.2	85.8	83.8
EGFR21.M02	21:33:13.89	19.9	221.8	99.9	82.3	80.8	84.6	81.1	83.4	87.6	95.5	95.5	92.9	84.5	86.3	84.2	82.8	82.5
EGFR21.M03	21:33:13.87	17.8	221.0	103.4	83.0	78.9	90.8	88.6	92.2	92.8	94.1	93.9	94.6	95.9	92.7	91.7	88.5	86.6
EGFR21.M04	21:33:14.55	10.0	432.8	96.5	75.8	77.1	80.9	76.3	76.1	81.4	87.7	91.0	89.9	87.9	83.7	82.2	81.4	78.4
EGFR21.M05	21:33:15.51	6.0	727.2	83.4	63.8	66.5	67.4	66.3	65.9	63.0	67.1	70.3	69.2	66.0	66.0	67.0	72.4	66.0
EGFR21.M06	21:33:15.71	4.9	884.5	85.9	66.9	65.1	69.1	66.3	68.5	69.4	71.6	76.0	79.1	78.8	79.0	76.1	72.7	67.1
EGFR21.M07	21:33:16.46	3.9	1111.6	79.0	66.2	68.8	69.6	66.8	67.2	59.3	62.6	65.6	66.8	69.9	69.4	67.5	66.0	60.0
EGFR21.M08	21:33:17.27	3.2	1355.0	87.7	64.8	65.3	67.9	64.1	69.6	70.7	73.2	77.8	79.6	81.1	80.1	78.7	74.3	65.8
EGFR21.M09	21:33:17.99	2.7	1576.8	71.8	58.5	56.8	56.6	52.1	55.7	57.9	60.3	61.9	62.8	61.9	61.8	57.3	55.1	49.0
EGFR21.M10	21:33:18.81	2.4	1823.4	65.3	52.4	52.5	51.9	55.3	51.8	51.8	50.7	51.5	49.8	46.8	45.9	43.8	41.9	38.7
EGFR21.M11	21:33:18.82	2.4	1826.4	64.8	51.9	49.4	51.2	48.5	48.5	48.8	50.9	54.1	56.4	57.5	54.6	51.7	50.6	44.5
EGFR21.M12	21:33:18.83	2.1	1829.1	73.8	52.2	52.3	60.6	61.8	63.3	59.6	61.3	63.6	60.8	61.3	58.1	57.3	52.7	47.2
EGFR21.M13	21:33:14.62	17.9	249.3	102.2	78.2	79.6	89.6	85.5	92.9	92.3	92.5	95.1	95.6	93.7	89.8	89.0	88.6	86.0
EGFR21.M14	21:33:14.62	17.5	251.7	100.0	84.4	83.4	84.8	80.9	77.9	87.4	92.4	94.8	92.1	86.1	92.8	84.3	86.4	82.2
EGFR21.M15	21:33:14.60	15.6	251.5	94.9	75.5	78.4	79.6	84.5	83.9	86.6	85.2	85.9	86.0	85.7	83.4	79.8	78.4	74.6
EGFR21.M16	21:33:14.55	56.2	91.1	111.0	87.1	82.8	85.1	94.3	101.6	104.1	98.3	101.8	104.6	99.9	97.5	98.7	98.4	94.7
EGFR21.M17	21:33:14.55	56.2	91.0	98.8	90.0	87.0	86.8	84.2	76.1	81.4	90.1	94.0	91.9	83.3	83.3	81.1	86.3	82.0
EGFR21.M18	21:33:18.38	3.1	1402.9	80.5	68.1	69.3	72.1	70.3	67.3	68.1	68.6	70.6	70.4	63.6	60.8	60.6	58.1	52.5
EGFR21.M19	21:33:19.10	2.7	1624.7	81.4	64.0	68.9	72.2	71.9	74.3	75.9	75.6	66.5	64.1	63.4	58.0	58.6	58.0	51.6
EGFR21.M20	21:33:19.93	2.3	1874.3	77.4	62.3	65.0	67.6	71.9	70.6	69.6	66.3	62.7	59.4	60.0	56.9	55.0	50.3	46.1

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR22.M01	21:36:49.55	34.7	264.3	99.3	78.1	83.8	88.0	87.3	88.8	89.6	89.4	88.9	91.0	87.4	85.6	83.2	82.7	82.2
EGFR22.M02	21:36:49.55	34.1	265.7	98.5	78.2	76.8	78.3	85.1	91.4	94.2	92.1	85.1	90.1	83.5	83.3	80.5	79.8	77.9
EGFR22.M03	21:36:49.52	32.6	262.0	101.0	78.6	89.9	89.1	91.1	90.9	91.7	92.0	92.5	93.1	89.0	86.5	86.4	83.4	80.2
EGFR22.M04	21:36:50.02	19.1	454.7	93.8	73.1	75.6	72.0	76.0	78.5	85.5	87.7	85.6	78.4	84.6	82.0	79.7	78.3	76.4
EGFR22.M05	21:36:50.88	11.6	738.5	83.1	67.6	69.3	67.4	64.3	67.3	74.2	77.0	75.4	71.6	69.0	67.9	68.5	66.9	62.0
EGFR22.M06	21:36:51.08	9.6	892.7	86.3	68.7	70.8	71.9	67.5	69.0	74.5	78.2	79.9	77.5	73.2	69.8	70.7	63.9	65.3
EGFR22.M07	21:36:51.79	7.7	1117.0	82.3	62.0	70.3	68.4	65.3	59.4	66.1	69.4	72.8	76.4	75.1	68.3	62.8	66.4	58.3
EGFR22.M08	21:36:52.58	6.3	1358.4	77.9	62.0	63.3	65.2	64.3	68.6	67.2	67.1	71.4	71.1	69.8	66.6	61.9	57.0	53.6
EGFR22.M09	21:36:53.29	5.4	1578.7	74.4	58.1	60.1	60.0	57.3	53.9	55.5	58.7	62.2	60.8	62.9	58.4	55.7	51.2	47.8
EGFR22.M10	21:36:54.05	5.0	1838.9	69.8	58.6	60.5	62.1	61.9	59.7	57.6	55.7	56.0	57.7	55.3	49.5	49.2	46.1	41.7
EGFR22.M11	21:36:54.06	5.0	1841.9	68.9	57.4	56.2	57.0	55.6	54.0	51.2	54.9	57.4	60.3	62.7	57.6	56.0	49.1	42.7
EGFR22.M12	21:36:54.07	4.7	1844.1	75.2	58.5	62.1	65.5	67.2	65.5	66.0	64.7	61.4	59.2	59.9	57.8	57.7	52.8	46.4
EGFR22.M13	21:36:50.22	31.4	289.7	100.4	78.9	79.8	86.0	86.8	91.1	90.1	90.4	94.0	90.0	89.3	88.7	88.4	86.2	84.8
EGFR22.M14	21:36:50.23	31.0	291.3	99.5	69.9	69.5	82.9	90.2	93.0	91.5	86.3	92.5	87.3	89.1	86.4	85.5	83.4	81.5
EGFR22.M15	21:36:50.18	29.5	288.2	92.4	71.7	77.6	81.5	81.5	80.4	83.6	83.4	82.6	83.0	81.8	79.2	78.0	76.6	75.7
EGFR22.M16	21:36:50.53	57.7	178.3	107.5	73.8	84.7	94.0	95.6	97.2	93.3	100.3	95.0	100.7	98.7	96.4	96.2	95.1	92.0
EGFR22.M17	21:36:50.53	57.7	178.3	104.5	84.4	77.8	84.6	93.2	95.0	96.6	90.8	99.8	94.7	93.8	91.0	90.2	87.4	87.4
EGFR22.M18	21:36:53.64	6.1	1406.2	79.1	65.8	70.1	70.8	69.3	68.6	65.8	67.1	63.5	63.0	62.7	60.0	59.1	57.5	50.8
EGFR22.M19	21:36:54.36	5.3	1626.6	77.3	63.2	61.7	62.1	66.1	67.8	70.4	70.2	66.4	59.7	57.6	58.5	55.2	55.9	47.2
EGFR22.M20	21:36:55.17	4.6	1875.1	78.8	63.3	63.0	65.5	69.3	70.0	70.9	70.2	69.5	63.4	62.6	64.6	60.3	54.4	49.4

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR23.M01	21:40:12.57	33.0	256.7	99.7	82.7	86.3	88.6	88.3	89.1	91.6	92.2	91.7	91.2	86.9	85.6	84.0	82.2	81.9
EGFR23.M02	21:40:12.56	32.5	258.2	99.9	82.9	78.1	75.6	81.3	89.1	94.6	91.5	88.0	91.2	88.7	86.6	83.1	81.9	79.3
EGFR23.M03	21:40:12.52	30.9	254.8	101.0	78.5	88.0	88.2	89.0	89.6	93.6	93.7	94.1	91.7	88.6	86.5	83.6	82.9	81.2
EGFR23.M04	21:40:13.08	17.9	451.5	94.1	72.0	73.5	70.6	70.9	76.8	85.9	89.3	85.4	79.8	84.0	77.3	79.3	75.6	73.7
EGFR23.M05	21:40:13.99	10.8	738.5	83.0	70.0	66.7	66.1	65.0	69.3	71.2	75.1	78.5	74.4	71.1	71.4	72.4	65.0	61.6
EGFR23.M06	21:40:14.20	8.9	894.4	88.4	70.7	69.5	73.0	68.0	73.4	79.4	82.8	81.3	79.2	73.2	73.4	75.7	70.1	67.0
EGFR23.M07	21:40:14.95	7.1	1120.2	80.2	68.9	71.7	72.2	69.3	59.9	65.9	71.8	69.7	69.9	67.6	65.1	59.1	56.3	53.3
EGFR23.M08	21:40:15.77	5.8	1363.1	81.5	63.4	61.1	62.0	60.2	62.0	70.4	74.1	75.9	75.7	74.7	71.3	64.7	63.0	61.4
EGFR23.M09	21:40:16.51	5.0	1584.8	73.6	62.8	63.5	63.9	59.9	62.5	62.6	64.0	62.6	65.5	64.9	60.6	57.4	55.4	47.8
EGFR23.M10	21:40:17.34	4.4	1831.6	69.9	57.2	62.3	60.9	61.2	59.8	59.1	58.5	56.3	56.8	57.3	52.8	50.4	45.2	41.5
EGFR23.M11	21:40:17.35	4.3	1834.6	68.5	57.9	58.7	57.0	55.8	55.3	53.2	55.9	57.9	60.4	61.2	56.7	51.0	46.4	42.5
EGFR23.M12	21:40:17.36	4.1	1836.9	75.2	57.3	66.1	67.9	67.1	64.3	66.9	65.5	61.8	59.9	61.2	57.0	53.3	50.6	44.4
EGFR23.M13	21:40:13.26	29.8	282.0	101.8	81.9	84.6	91.1	86.6	87.1	92.3	93.1	94.4	91.1	90.1	90.0	87.9	86.2	80.5
EGFR23.M14	21:40:13.26	29.3	283.7	99.3	74.1	67.9	81.9	88.5	95.2	90.5	84.0	90.4	89.0	89.0	85.3	83.6	80.2	80.0
EGFR23.M15	21:40:13.22	27.8	281.0	93.2	76.9	76.9	77.2	80.0	82.5	87.2	85.9	84.6	84.7	82.5	79.9	79.6	77.1	72.8
EGFR23.M16	21:40:13.53	57.0	166.0	108.8	72.3	84.2	92.2	95.5	99.4	93.2	103.3	99.3	101.7	99.8	96.5	95.1	94.4	89.9
EGFR23.M17	21:40:13.53	57.1	166.0	108.1	72.7	82.4	86.3	97.5	99.4	91.8	99.4	98.7	100.0	98.0	95.6	93.9	94.3	91.8
EGFR23.M18	21:40:16.86	5.7	1410.2	81.8	66.7	71.0	76.6	72.2	74.4	74.9	74.4	72.0	61.1	60.0	61.9	67.5	59.5	54.6
EGFR23.M19	21:40:17.62	4.9	1632.0	78.6	58.6	65.8	72.0	72.5	71.0	67.2	66.3	67.4	66.3	56.7	58.4	62.3	57.4	49.6
EGFR23.M20	21:40:18.46	4.2	1881.9	83.2	71.0	74.7	77.8	74.5	71.8	72.1	75.5	69.2	63.5	63.5	62.0	59.7	57.5	51.2

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR24,M01	21:43:27.49	32.9	270.2	102.6	81.4	81.4	89.8	89.8	92.3	93.9	95.5	91.9	91.9	91.3	90.1	90.7	88.9	89.1
EGFR24,M02	21:43:27.48	32.4	271.6	99.9	79.6	75.6	73.3	85.6	91.8	94.1	94.6	88.5	89.6	86.2	86.0	84.9	82.2	80.9
EGFR24,M03	21:43:27.44	30.8	268.3	100.3	79.6	86.8	84.3	88.4	88.7	94.8	93.1	91.7	90.4	88.6	85.6	86.7	83.9	81.5
EGFR24,M04	21:43:27.94	18.3	461.9	94.6	76.7	75.9	72.7	69.8	78.8	90.4	88.5	86.9	81.3	85.3	78.3	81.5	75.2	73.2
EGFR24,M05	21:43:28.75	11.3	744.2	87.3	66.2	67.5	71.8	66.7	69.8	74.0	78.2	82.7	82.3	77.4	73.3	73.7	69.1	63.9
EGFR24,M06	21:43:28.90	9.3	896.7	86.8	62.3	68.7	68.5	66.6	66.8	75.4	80.9	78.7	80.7	76.9	74.1	77.1	73.1	67.5
EGFR24,M07	21:43:29.58	7.4	1119.1	79.6	67.7	72.2	67.9	66.1	60.9	62.5	66.3	71.2	70.5	70.6	62.9	58.7	58.4	51.3
EGFR24,M08	21:43:30.31	6.1	1358.5	78.4	61.6	66.1	64.5	61.1	60.6	65.5	66.8	71.4	71.9	72.5	67.3	62.2	64.6	57.5
EGFR24,M09	21:43:30.98	5.3	1576.9	73.0	61.7	61.8	59.0	59.7	57.7	57.7	59.9	64.0	63.5	66.6	62.8	60.5	54.9	49.4
EGFR24,M10	21:43:31.74	4.6	1820.3	76.0	61.0	63.4	63.8	62.9	65.4	68.1	67.4	66.4	66.2	65.8	64.7	60.2	53.9	45.8
EGFR24,M11	21:43:31.75	4.6	1823.2	78.4	56.5	60.7	58.6	55.3	57.2	59.7	69.1	69.6	73.1	72.8	67.4	60.1	57.2	49.7
EGFR24,M12	21:43:31.76	4.3	1825.5	79.4	60.1	67.7	68.0	69.4	65.4	70.8	75.1	66.5	67.8	62.2	60.1	55.9	52.2	49.9
EGFR24,M13	21:43:28.16	29.7	296.9	99.0	85.4	84.5	86.1	89.3	88.9	88.6	91.5	90.3	88.7	87.1	87.4	86.7	84.9	81.0
EGFR24,M14	21:43:28.15	29.3	298.6	99.7	80.3	76.4	70.9	82.9	90.4	91.8	92.6	83.7	90.0	86.1	89.8	89.4	86.8	85.4
EGFR24,M15	21:43:28.11	27.8	295.8	103.3	85.5	85.9	91.2	92.0	93.6	97.5	95.9	94.2	91.7	94.4	93.0	91.5	90.2	88.4
EGFR24,M16	21:43:28.38	58.2	172.8	104.0	78.1	72.8	81.0	91.2	96.0	99.1	94.8	92.4	97.5	90.1	90.9	89.9	87.9	87.3
EGFR24,M17	21:43:28.38	58.2	172.8	98.4	82.6	83.5	75.5	74.2	74.7	87.1	93.1	93.6	85.3	90.3	83.3	82.4	77.9	79.4
EGFR24,M18	21:43:31.38	6.0	1407.5	84.8	68.3	70.1	74.1	79.0	77.3	76.1	74.6	75.1	73.2	65.6	61.5	59.1	61.6	54.3
EGFR24,M19	21:43:32.05	5.2	1626.1	78.7	63.3	64.1	66.3	66.5	70.6	70.9	72.7	68.7	66.6	59.1	56.7	54.5	51.9	45.5
EGFR24,M20	21:43:32.81	4.5	1872.4	82.4	69.6	70.7	75.5	72.4	75.9	74.6	71.5	68.2	67.6	63.3	64.9	68.3	62.7	53.3

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR25.M01	21:48:19.00	1.9	283.2	79.3	68.3	74.0	67.5	67.3	67.5	64.3	57.7	57.3	54.8	53.4	53.8	51.8	53.4	51.0
EGFR25.M02	21:48:19.02	1.6	286.3	76.1	64.8	65.8	66.2	62.7	56.9	55.0	56.7	57.5	56.0	57.9	55.5	54.8	54.4	52.2
EGFR25.M03	21:48:19.02	0.1	289.3	95.2	80.2	80.5	79.9	81.1	80.3	83.5	85.3	86.5	84.8	82.7	85.1	85.8	85.3	80.2
EGFR25.M04	21:48:19.81	0.9	510.1	80.5	70.5	65.4	67.4	68.0	62.9	63.4	64.2	70.2	67.9	64.3	62.6	65.6	68.1	61.2
EGFR25.M05	21:48:20.90	0.6	812.9	96.3	78.1	80.6	76.5	70.4	73.0	73.3	80.2	85.0	87.6	88.9	89.3	89.3	83.9	76.1
EGFR25.M06	21:48:21.23	0.5	974.6	96.4	77.1	81.0	76.1	69.7	71.5	74.0	80.8	84.9	88.0	88.8	89.9	88.6	79.2	70.7
EGFR25.M07	21:48:22.02	0.4	1206.1	70.7	56.1	63.6	54.1	51.6	50.5	45.4	48.8	53.3	53.8	56.6	57.7	55.2	50.7	47.5
EGFR25.M08	21:48:22.91	0.3	1454.0	68.7	47.4	45.9	44.8	46.0	43.7	50.8	55.5	62.2	58.5	58.4	58.4	63.4	57.9	46.3
EGFR25.M09	21:48:19.60	0.3	1513.8	69.7	53.8	48.0	46.5	45.3	43.1	44.7	49.7	54.1	56.8	57.4	55.7	55.8	50.2	43.7
EGFR25.M10	21:48:19.55	0.3	1731.9	68.1	46.8	41.3	46.6	50.5	46.2	54.8	60.1	55.8	54.8	51.8	48.7	50.0	42.8	39.4
EGFR25.M11	21:48:19.54	0.3	1734.6	67.1	46.2	42.0	43.1	42.3	48.2	51.7	52.5	53.4	59.4	62.1	55.9	50.7	44.7	41.4
EGFR25.M12	21:48:19.55	0.0	1737.4	73.4	44.9	45.3	45.7	54.7	55.7	61.4	66.0	64.5	68.0	60.5	58.5	55.5	47.0	44.2
EGFR25.M13	21:48:19.70	1.7	314.0	91.8	72.3	71.1	73.9	75.9	81.8	81.1	82.8	82.0	83.5	82.8	79.5	80.5	79.1	74.4
EGFR25.M14	21:48:19.71	1.5	317.1	88.3	78.1	79.4	77.8	76.6	75.1	77.1	72.3	73.6	70.6	71.4	70.7	73.2	73.4	71.6
EGFR25.M15	21:48:19.72	0.0	320.1	86.8	76.1	74.7	73.9	75.1	76.8	76.7	77.4	73.9	69.7	68.9	69.1	71.3	72.7	67.3
EGFR25.M16	21:48:18.80	7.5	62.0	98.0	85.0	84.0	82.6	84.6	85.6	87.0	92.9	89.9	86.8	84.0	85.1	84.1	81.8	81.1
EGFR25.M17	21:48:18.80	7.5	62.2	98.1	88.9	87.9	85.5	86.9	87.6	87.9	89.5	92.1	91.6	87.7	85.7	86.1	86.1	84.9
EGFR25.M18	21:48:23.95	0.3	1499.7	67.6	53.1	49.5	51.9	55.5	53.6	54.7	54.5	57.6	56.3	52.3	51.4	46.2	45.4	41.1
EGFR25.M19	21:48:24.77	0.3	1725.3	73.1	49.8	48.4	47.3	54.5	64.1	63.6	61.2	62.0	64.4	58.8	56.0	50.8	46.7	45.2
EGFR25.M20	21:48:25.67	0.2	1979.1	67.9	46.0	51.6	53.0	54.2	63.2	58.4	56.0	57.1	53.0	46.5	46.8	43.6	42.2	37.6

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR26,M01	21:52:21.06	2.8	213.8	95.1	86.5	82.1	81.2	82.6	81.9	84.7	87.5	83.2	79.3	74.4	73.9	73.9	72.1	71.0
EGFR26,M02	21:52:21.08	2.4	216.8	97.0	86.9	83.0	80.8	81.1	80.0	81.3	84.2	82.8	84.0	83.3	85.3	84.3	85.6	84.9
EGFR26,M03	21:52:21.09	0.3	219.6	100.6	84.7	79.6	82.3	87.2	90.8	93.6	95.2	91.3	84.5	89.8	84.2	88.2	85.0	80.5
EGFR26,M04	21:52:21.77	1.2	435.3	85.5	79.2	78.2	70.0	62.5	57.1	59.1	68.9	67.3	72.8	77.0	76.2	75.2	74.4	69.5
EGFR26,M05	21:52:22.70	0.7	730.9	78.1	55.5	59.8	50.1	50.5	52.5	56.2	64.0	67.5	71.8	74.0	68.9	69.2	60.5	56.7
EGFR26,M06	21:52:22.87	0.6	887.3	78.9	55.6	61.6	54.1	52.6	50.5	56.9	64.0	67.6	69.7	73.8	71.8	69.5	65.2	58.6
EGFR26,M07	21:52:23.59	0.5	1113.3	72.8	61.7	59.7	55.4	52.8	54.1	52.6	52.1	54.8	59.6	64.2	64.4	57.5	59.1	52.1
EGFR26,M08	21:52:24.35	0.4	1355.3	70.3	49.6	53.4	45.9	47.6	45.2	49.7	56.8	59.9	63.3	64.9	60.6	58.7	52.7	45.1
EGFR26,M09	21:52:25.05	0.3	1575.6	66.1	47.8	54.4	48.9	48.4	43.8	48.9	52.7	53.7	56.0	58.8	56.5	56.3	52.6	45.7
EGFR26,M10	21:52:25.82	0.3	1820.3	63.9	45.0	50.6	48.1	51.8	48.6	50.3	54.0	48.9	49.6	50.5	45.2	48.3	43.1	38.2
EGFR26,M11	21:52:25.83	0.3	1823.4	65.2	44.6	48.6	44.5	43.1	41.6	44.4	52.6	52.4	54.8	60.7	54.7	56.9	47.1	36.9
EGFR26,M12	21:52:25.84	0.0	1826.5	72.8	46.0	54.7	59.5	59.1	59.3	60.4	63.1	64.0	64.5	66.0	57.0	52.3	48.1	44.7
EGFR26,M13	21:52:21.84	2.4	246.8	97.6	80.4	79.0	79.3	84.2	84.7	86.6	89.7	90.1	87.5	86.2	83.2	87.8	82.2	81.7
EGFR26,M14	21:52:21.85	2.1	249.8	100.1	80.4	84.2	86.9	87.8	91.9	93.8	92.1	90.5	87.3	87.1	82.1	77.7	74.7	80.0
EGFR26,M15	21:52:21.86	0.3	252.6	102.1	79.4	87.9	90.1	88.0	90.9	95.1	94.2	92.3	89.2	89.3	90.6	89.5	90.5	88.2
EGFR26,M16	21:52:21.16	57.6	11.1	126.6	98.4	105.2	104.6	108.7	115.6	121.3	118.9	115.4	114.9	112.3	111.4	113.3	111.7	110.0
EGFR26,M17	21:52:21.16	57.6	11.1	102.5	94.9	92.9	94.4	95.0	92.9	90.2	89.1	88.8	89.9	88.0	88.5	88.1	86.9	86.3
EGFR26,M18	21:52:25.50	0.4	1404.4	76.8	64.3	67.6	68.6	63.3	66.3	67.6	69.1	66.4	62.7	62.3	57.0	55.4	58.1	51.8
EGFR26,M19	21:52:26.20	0.3	1624.6	73.2	62.8	62.0	61.0	60.4	60.6	64.9	63.0	63.6	63.6	62.3	53.4	52.6	51.6	47.5
EGFR26,M20	21:52:26.98	0.3	1872.5	70.5	60.5	54.5	54.4	57.5	60.6	60.1	62.0	62.6	61.4	56.0	51.6	50.3	48.0	41.9

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR27.M01	21:55:43.57	6.3	215.5	98.7	78.2	83.0	87.0	91.0	93.5	93.9	90.8	85.3	79.0	75.8	76.4	74.9	76.0	76.8
EGFR27.M02	21:55:43.58	5.9	218.3	97.3	81.7	82.1	82.9	89.3	89.4	88.9	85.0	82.2	83.2	83.4	85.9	85.6	83.8	79.7
EGFR27.M03	21:55:43.58	3.8	220.5	102.3	80.6	80.7	79.5	89.9	95.6	97.0	95.0	88.3	92.2	88.5	86.1	86.6	86.7	84.0
EGFR27.M04	21:55:44.24	3.0	435.4	91.6	74.0	70.7	67.9	66.7	68.9	68.7	75.9	82.0	83.7	82.1	84.1	83.9	81.6	75.4
EGFR27.M05	21:55:45.14	1.8	729.7	77.0	56.1	60.9	59.9	56.4	56.4	58.8	66.9	69.1	70.3	68.2	68.4	68.7	61.4	56.6
EGFR27.M06	21:55:45.31	1.4	885.2	76.2	59.2	59.8	58.9	57.4	55.8	57.9	65.1	65.3	69.4	63.9	66.2	68.3	62.1	55.1
EGFR27.M07	21:55:46.01	1.2	1110.4	70.5	58.6	63.9	52.7	51.4	50.2	50.8	52.7	53.8	56.9	63.1	55.0	56.2	52.4	46.4
EGFR27.M08	21:55:46.75	1.0	1351.4	71.6	52.0	49.8	45.0	44.7	47.8	54.7	58.4	59.4	61.7	64.8	65.6	60.7	52.2	47.4
EGFR27.M09	21:55:47.43	0.8	1570.9	67.9	52.2	49.0	47.6	50.2	51.2	47.8	53.6	53.6	56.7	58.2	56.1	54.0	49.5	44.5
EGFR27.M10	21:55:48.18	0.7	1814.8	61.0	47.0	44.3	49.7	51.4	52.7	49.2	48.0	42.3	42.4	42.4	43.0	42.0	40.8	35.7
EGFR27.M11	21:55:48.19	0.7	1817.8	61.3	46.9	41.0	43.9	43.8	46.3	42.5	44.4	46.6	49.1	50.2	51.8	49.7	45.1	37.9
EGFR27.M12	21:55:48.20	0.5	1820.8	74.8	42.3	51.7	53.7	55.1	54.6	60.6	67.2	68.2	64.4	59.7	58.1	56.3	49.6	44.0
EGFR27.M13	21:55:44.32	5.5	248.6	100.3	64.1	74.4	84.0	90.0	90.1	84.7	93.2	89.3	90.2	88.3	88.0	87.0	86.2	81.2
EGFR27.M14	21:55:44.33	5.2	251.5	100.6	80.8	84.2	85.6	90.9	91.9	92.5	94.5	90.0	82.8	79.2	86.4	90.1	89.3	82.0
EGFR27.M15	21:55:44.32	3.3	253.7	105.1	81.2	84.6	86.8	92.2	94.0	95.8	98.5	95.3	94.1	95.2	92.8	91.9	92.2	90.0
EGFR27.M16	21:55:43.75	57.5	26.9	121.8	100.2	96.5	93.0	105.0	112.0	115.5	112.7	109.8	112.6	107.2	109.3	109.4	107.6	106.9
EGFR27.M17	21:55:43.76	57.5	26.9	108.2	96.6	99.5	98.0	96.8	95.0	89.1	95.9	102.0	103.7	99.0	92.1	95.3	92.0	92.7
EGFR27.M18	21:55:47.85	0.9	1401.0	63.5	48.5	43.6	45.6	44.4	44.0	44.7	47.5	45.7	45.3	43.7	43.2	43.4	41.6	42.3
EGFR27.M19	21:55:48.53	0.8	1620.4	61.6	48.2	44.5	45.9	43.3	42.9	44.3	43.7	40.5	42.4	40.6	39.2	39.8	39.0	38.0
EGFR27.M20	21:55:49.28	0.7	1867.3	59.8	47.9	46.5	42.9	42.3	43.3	42.3	44.9	45.6	43.6	41.7	41.4	42.1	39.3	39.1

DIRECTIVITY ANGLE = 122.5 deg

FILENAME	RECEIVE TIME	BETA (deg)	SR (m)	OSPL	1/3 OCTAVE BAND CENTER FREQUENCIES (kHz) 0.10	0.13	0.16	0.20	0.25	0.32	0.40	0.50	0.63	0.79	1.0	1.3	1.6	2.0
EGFR28.M01	22:22:30.00	0.1	755.6	84.0	77.6	75.0	71.9	69.3	66.9	65.0	68.2	65.7	67.3	68.0	64.5	58.3	55.6	55.8
EGFR28.M02	22:22:30.00	0.0	758.6	85.4	77.7	74.3	70.8	68.0	65.7	61.1	65.8	66.4	72.4	75.6	74.1	69.2	67.2	65.4
EGFR28.M03	22:22:30.00	-0.6	761.7	88.0	72.9	68.5	73.8	76.8	76.9	75.5	76.9	75.5	78.7	79.3	75.2	72.7	67.8	65.4
EGFR28.M04	22:22:30.00	0.0	974.5	83.1	75.0	71.7	62.0	59.7	57.7	55.1	58.9	67.6	71.1	72.7	72.4	70.3	63.8	53.7
EGFR28.M05	22:22:48.00	0.0	1266.6	73.5	61.8	55.2	46.2	45.8	44.7	47.0	52.1	55.1	58.4	56.4	51.6	45.5	43.9	39.8
EGFR28.M06	22:22:48.00	0.0	1438.2	73.5	61.7	55.4	45.5	45.6	44.5	47.3	52.3	54.6	58.4	56.3	51.6	45.4	43.8	39.7
EGFR28.M07	22:22:48.00	0.0	1661.5	71.9	58.0	63.4	48.6	46.6	45.5	41.2	46.3	48.7	52.4	51.6	48.3	39.6	38.3	35.4
EGFR28.M08	22:22:38.00	0.0	1900.6	72.2	56.8	54.5	47.3	44.3	42.6	44.2	47.4	52.7	55.4	53.5	53.9	46.3	41.6	38.8
EGFR28.M09	22:22:38.00	0.0	2118.3	73.3	57.8	55.3	49.3	50.6	44.5	47.6	52.3	54.8	58.4	57.2	56.1	47.3	40.3	37.0
EGFR28.M10	22:22:30.00	0.0	2360.3	71.1	54.5	52.6	52.1	52.6	52.9	51.7	55.7	56.7	56.5	49.5	49.2	45.7	40.6	34.4
EGFR28.M11	22:22:30.00	0.0	2363.3	65.9	47.1	44.7	41.3	39.3	42.3	42.1	49.8	56.6	58.0	51.3	48.9	40.7	36.1	30.2
EGFR28.M12	22:22:30.00	-0.2	2366.4	62.1	41.8	47.5	50.5	49.7	53.1	51.3	50.5	51.9	47.5	44.5	43.7	38.4	30.7	26.8
EGFR28.M13	22:22:29.00	0.1	753.7	96.8	85.7	88.2	89.5	86.7	83.5	83.1	83.8	86.2	88.0	82.6	80.8	79.0	75.9	67.7
EGFR28.M14	22:22:29.00	0.0	756.7	101.6	86.5	90.1	91.7	91.9	92.7	94.4	93.3	92.7	88.2	83.5	75.7	73.1	71.3	65.5
EGFR28.M15	22:22:29.00	-0.6	759.8	102.5	86.6	90.9	92.3	92.7	93.5	95.7	94.5	93.5	89.5	85.0	76.0	77.5	76.7	68.4
EGFR28.M16	22:22:29.00	0.0	510.0	105.7	89.6	91.6	92.7	95.1	97.5	97.1	97.2	97.5	96.0	93.8	88.0	84.8	81.9	75.1
EGFR28.M17	22:22:29.00	0.0	510.0	105.5	89.8	91.3	92.7	95.2	97.3	96.4	97.4	97.3	96.0	93.5	88.4	84.7	81.7	75.3
EGFR28.M18	22:22:35.00	0.0	1899.0	96.8	78.9	84.2	89.8	91.0	90.0	86.0	87.7	79.9	73.1	65.9	60.5	59.2	58.5	57.1
EGFR28.M19	22:22:35.00	0.0	2116.8	94.0	78.4	83.5	88.4	89.8	86.4	80.1	79.2	67.9	62.3	60.3	55.9	54.3	53.6	51.5
EGFR28.M20	22:22:35.00	0.0	2362.0	92.5	77.5	84.1	87.9	87.9	82.4	74.5	71.8	62.2	57.3	57.8	56.6	55.5	53.0	51.9

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NASA TM 80185		

4. Title and Subtitle	5. Report Date
Ground Effects on Aircraft Noise	November 1979
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
William L. Willshire, Jr. and David A. Hilton	
	10. Work Unit No.
9. Performing Organization Name and Address	505-32-03
Langley Research Center National Aeronautics and Space Administration Hampton, Virginia 23665	11. Contract or Grant No.
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	Technical Memorandum
National Aeronautics and Space Administration Washington, D. C. 20546	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract A flight experiment was conducted to investigate air-to-ground propagation of sound near grazing incidence. A turbojet-powered aircraft was flown at low altitudes over the ends of two microphone arrays. An eight-microphone array was positioned along a 1850 m concrete runway. The second array consisted of 12 microphones positioned parallel to the runway over grass. Twenty-eight flights were flown at altitudes ranging from 10 m to 160 m. The acoustic data recorded in the field have been reduced to one-third-octave band spectra and time correlated with the flight and weather information. The acoustic, tracking and weather information is presented in the Appendices in a form which will allow independent analysis of the data. Only the acoustic information which was emitted at an angle of 122.5 degrees is included. A small portion of the data has been further reduced in a preliminary analysis to values of ground attenuation as a function of frequency and incidence angle by two different methods. In one method, referred to as the near-far comparison method, acoustic data at a microphone position close to the flight track are chosen as a reference and are compared with data taken at down-range microphone positions. The second method used was a direct comparison between two microphones at equal distance from the flight track but over different surfaces. In both methods, the acoustic signals compared originated from identical sources. Attenuation results obtained by using the two methods were in general agreement. The measured ground attenuation was largest in the frequency range of 200 to 400 Hz. A strong dependence was found between ground attenuation and incidence angle with little attenuation measured for angles of incidence greater than 10 to 15 degrees.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Flight acoustic data Ground effects Atmospheric sound propagation	Unclassified - unlimited Subject Category 71

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	120	$6.50

* For sale by the National Technical Information Service, Springfield, Virginia 22161